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STATE OF MONTANA

DEPARTMENT OF COMMUNITY AFFAIRS
AERONAUTICS DIVISION

REPORT ON THE EFFECTIVENESS OF THE AIRCRAFT POOL LAW AND OTHER ASPECTS OF STATE AIRCRAFT OPERATIONS

February 1977

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AERONAUTICS DIVISION

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76-9

MONTANA LEGISLATIVE AUDIT COMMITTEE
AND OFFICE OF THE LEGISLATIVE AUDITOR

The Legislative Audit Committee is a joint, bipartisan standing committee of the Montana Legislature. The committee is composed of eight members (listed below) appointed by the Senate Committee on Committees with the approval of the Senate and the Speaker of the House.

The committee and the Office of the Legislative Auditor were established for the purpose expressed in Section 79-2301, R.C.M. 1947:

> "Because the legislative assembly is responsible for authorizing the expenditure of public moneys, designating the sources from which moneys may be collected, shaping the administration to perform the work of state government, and is held finally accountable for fiscal policy, the legislative assembly should also be responsible for the audit of fiscal accounts and records so that it may be assured that its directives have been faithfully carried out. It is the intent of this act that each agency of state government be audited for the purpose of furnishing the legislative assembly with factual information vital to the discharge of its legislative duties."

To accomplish the foregoing purpose, the Office of the Legislative Auditor is empowered by law to conduct audits of state agencies to ascertain, among other things, whether state agencies are:

> "... carrying out only those activities or programs authorized by the legislative assembly and is conducting them efficiently and effectively." (Emphasis supplied)

The law also authorizes the Office of the Legislative Auditor to make recommendations for improvement of state government programs and operations. Recommendations for improvement of administrative activities are addressed to the agencies responsible for the activities. Recommendations for legislative changes are left to the discretion of the Legislature.

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February 8, 1977

The Legislative Audit Committee
of the Montana State Legislature:

Herein transmitted is our program/performance audit of the state aircraft pool law which requires the Department of Community Affairs to be the custodian of all state aircraft. The purposes of our audit were to determine the effectiveness of Montana's aircraft pool law and to evaluate the effectiveness and efficiency of state aircraft operations.

The purpose of the audit is explained in Chapter I (page 1) of the report and in the summary which begins on page S-1. The audit encompassed the aircraft operations of all five civilian state agencies that presently operate aircraft--the Departments of Community Affairs, Highways, Fish and Game, Natural Resources and Conservation, and Livestock. The audit did not include the military aircraft operations of the Department of Military Affairs.

This report includes recommendations for the implementation of the state's aircraft pool law and for the improvement of the state's aircraft operations.

We wish to express our appreciation to the administrator of the Aeronautics Division and to the directors of the other four state departments which operate aircraft for the assistance they and their staffs provided during our audit.

Respectfully submitted,

Morris L. Brusett

Morris L. Brusett, C.P.A.
Legislative Auditor

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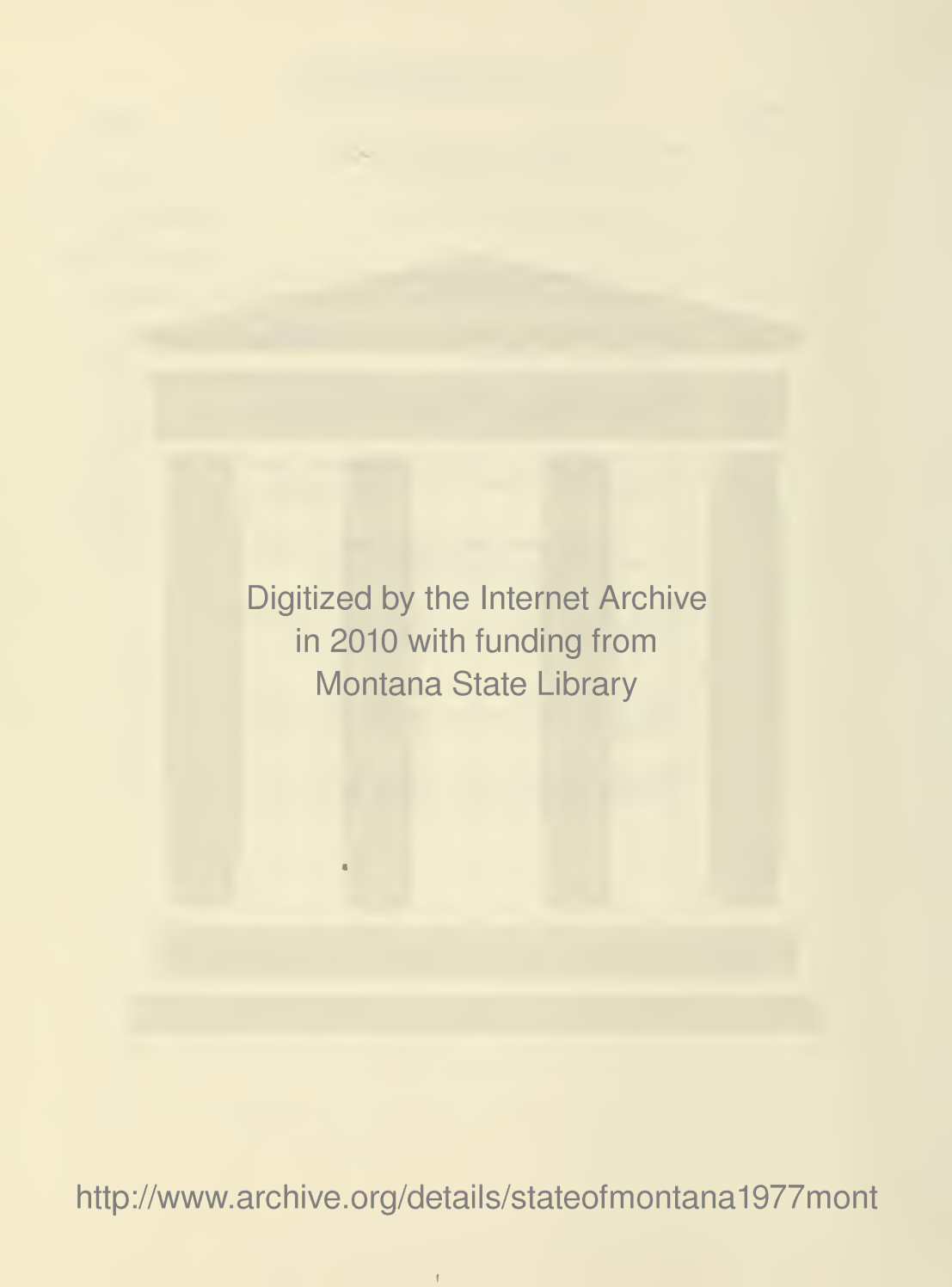
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OFFICE OF THE LEGISLATIVE AUDITOR

REPORT ON THE EFFECTIVENESS OF THE AIRCRAFT POOL LAW AND OTHER ASPECTS OF STATE AIRCRAFT OPERATIONS

SUMMARY

This report is the result of our program audit of the effectiveness of Montana's aircraft pool law and the operation of state aircraft.

CHAPTER I. INTRODUCTION

This report is presented in six chapters: Chapter I (page 1) presents an introduction and summarizes the scope and objectives of the audit; Chapter II (page 3) presents a background of the state aircraft pool law; Chapter III (page 8) discusses present state aircraft operations and potential benefits and problems associated with the pooling of all state aircraft; Chapter IV (page 45) discusses state employees' use of the least costly mode of transportation when traveling on state business; Chapter V (page 52) discusses the state's air transportation planning system and aircraft need determinations; and Chapter VI (page 62) discusses lease versus purchase cost comparisons.

The objectives of the audit were to determine the effectiveness of Montana's aircraft pool law (Sections 1-1101 through 1-1105, R.C.M. 1947), and to evaluate the effectiveness and efficiency of the state's aircraft operations (page 2).

CHAPTER II. BACKGROUND ON THE AIRCRAFT POOL

In 1962 the Aeronautics Commission purchased an airplane to provide transportation to the Governor and other state officials (page 3). By 1973 the Aeronautics Division and four other state agencies independently operated a total of 15 aircraft (page 4).

In 1972 the Governor asked the five state agencies to centralize all state aircraft and pilots under the general administrative control of the Aeronautics Division and during 1973 some of the agencies made their Helena-based aircraft and pilots available to the aircraft pool (pages 5 and 6). However, the agencies said the temporary arrangement was unsatisfactory and, as a consequence, the attempt to administratively centralize the state aircraft operations failed (page 6).

In 1974 the legislature provided a legal basis for the centralization of state aircraft by enacting Senate Bill 508. It required the Department of Community Affairs to be the custodian of state owned or leased airplanes. The law also gave the department the authority to promulgate reasonable rules and regulations for the use of state aircraft, and specifically provided that agencies which need specially modified aircraft shall have priority for the use of such aircraft. The law also exempts aircraft from the pool if such pooling would result in an agency's loss of federal funds. We refer to the 1974 law as the aircraft pool law (pages 6 and 7).

CHAPTER III. IMPLEMENTATION OF THE AIRCRAFT POOL LAW

The aircraft pool law has not been effectively implemented. During fiscal year 1975-76 five state agencies operated 17 aircraft (page 8). These agencies are the Aeronautics Division and the Departments of Highways, Fish and Game, Livestock, and Natural Resources and Conservation. These five agencies operate their aircraft independently of one another although they occasionally cooperate with each other and make their aircraft and pilots available to other state agencies upon request (page 9).

We found that the state could meet its aircraft needs more effectively and efficiently if the centralized control and coordination of aircraft envisioned by the aircraft pool law were achieved. Pooling of all state aircraft would provide for more effective and efficient use of state aircraft and would provide general benefits in the areas of aircraft insurance and maintenance and the acquisition, disposal, and operation of state aircraft (page 17). Specific improvements in the state's aircraft operations could be obtained in the areas of passenger service for Department of Highways employees (page 18), aerial photography (page 21), the operation of special purpose aircraft (page 27), and the procurement of aviation fuel (page 29).

While the pooling of state aircraft could provide benefits to the state such pooling may present problems in several areas which we believe can be overcome in the interest of better and more effective state aircraft operations. These areas are the possible diversion of funds with respect to Department of Highways and Fish and Game aircraft purchased with earmarked revenues (page 32); the availability of specially modified or limited use aircraft to the agencies that presently operate such aircraft (page 38); the status of the state pilots in some of these agencies (page 40); and the overall funding of the state's aircraft operations (page 42).

The laws governing state aircraft operations currently require the Department of Community Affairs to be the custodian of all state airplanes and to prepare rules and regulations governing the use of state aircraft. In spite of this law four other state departments have their own aircraft and aircraft operations. Pooling of these aircraft would provide for the coordination of the state's aircraft operations, thus improving the

effectiveness and efficiency of those operations (page 43). In view of the fact that it is currently required by law and is desirable itself, we recommend (page 44) that:

1. *The Departments of Highways, Fish and Game, Livestock, and Natural Resources and Conservation transfer their aircraft and full time pilots to the Aeronautics Division.*
2. *The Department of Community Affairs make formal arrangements with the Department of Highways and Department of Fish and Game to compensate them for the use by other agencies of the aircraft transferred to the division and to allow them use of the transferred aircraft at rates which exclude depreciation until such time as the market value of the aircraft have been amortized.*
3. *The Aeronautics Division prepare rules and regulations for the use of state aircraft including provisions for special assignment of aircraft.*
4. *The Aeronautics Division request the Department of Administration to obtain competitively bid purchase orders for the state's aviation fuel.*
5. *The Aeronautics Division request that its revolving account budget for aircraft operations be increased to include the cost of operating all state aircraft.*

The Departments of Community Affairs (page 71) and Natural Resources and Conservation (page 80) generally agreed with our recommendations. The Departments of Highways (page 75), Livestock (page 82), and Fish and Game (page 77) disagreed with our recommendations. The Departments of Highways and Fish and Game expressed the view that transfer of their

aircraft would constitute a diversion of their earmarked revenues. We believe there would be no diversion if the departments were compensated for their aircraft. We discuss how this could be done on page 32. The Department of Livestock believes that there would be no benefits from the aircraft pool. The obvious benefits of the aircraft pool are discussed in the report (page 17).

CHAPTER IV. LEAST COSTLY MODE OF TRANSPORTATION

Regulations issued by the Department of Administration state that it is state policy for employees to use the least costly mode of transportation (page 45). The least costly mode of transportation depends upon many factors. Because there are so many variables no one type of transportation will always be the least costly means of transportation. Consequently, it is difficult to generalize about which mode of transportation is the least costly (page 45).

We found that some employees who used state cars to make trips could have made their trips at less cost to the state in state aircraft, and some employees who traveled in state aircraft could have made their trips at less cost in state automobiles (page 47). The audit did not disclose any universal conclusions as to what means of travel is the most efficient. However, it is evident that significant savings are available if employees travel by the least costly means of transportation (pages 47 and 48). In this regard, during fiscal year 1975-76 the state spent about $8 million for employee travel (page 48).

Some employees who drove were not aware of the aircraft pool or of their eligibility to use state aircraft. Other employees were aware of the aircraft pool but believed flying would cost too much (page 49).

Some employees said they would like to fly but needed a car when they reached their destination. Generally, state employees were not knowledgeable of the fact that the Department of Highways has cars available at certain Montana towns (page 50). State agencies have not established adequate controls to assure that their employees use the least costly mode of transportation (page 49). To accomplish this and assist state employees in selecting the least costly means of transportation, we are recommending (page 51) that:

The Department of Administration collaborate with the Department of Highways and the division to formulate procedures for inclusion in the Montana Administrative Manual governing the comparison of state employee transportation by aircraft pool and automobile.

The two primary agencies involved with this recommendation, the Department of Community Affairs (page 72) and the Department of Administration (page 84) agreed with our recommendation.

CHAPTER V. AIR TRANSPORTATION PLANNING AND AIRCRAFT NEED DETERMINATIONS

The Aeronautics Division has not established any formal or written objectives for its air transportation program and the state aircraft pool. Without specific objectives and a specific plan to meet those objectives there is no assurance that the division's efforts will accomplish its objectives. In addition, without defined objectives and a written plan for achieving them, there is no way to evaluate the division's performance in terms of its objectives (page 52).

Accordingly, we are recommending (page 54) that the Aeronautics Division:

1. *Establish formal, written, and attainable objectives for the Air Transportation Bureau.*
2. *Develop a plan to accomplish these objectives.*
3. *Establish measurement criteria and periodically evaluate Air Transportation Bureau progress.*

The Department of Community Affairs agreed with the recommendation (page 73).

Many different factors affect the number and type of aircraft the state needs. The Aeronautics Division has not identified and quantified the aircraft needs of state agencies. Without properly assessing agency aircraft needs, the Aeronautics Division does not know whether the state presently operates too many or too few aircraft or if the state's aircraft are of the right type. Without such information the division cannot make informed decisions regarding the purchase or lease of additional aircraft or the disposal of existing aircraft (page 54).

Since there has not been an adequate determination of aircraft needs, decisions to buy or lease additional aircraft or sell existing aircraft are based upon a feel for the situation rather than measurable and quantified needs. Because aircraft are costly the Aeronautics Division should determine the state's aircraft needs before acquiring additional aircraft or disposing of existing aircraft. The need determinations should be based upon quantifiable data and should include long range projections as to the number and types of aircraft that will be needed (page 60). Therefore, we are recommending (page 61) that the Aeronautics Division:

Defer the acquisition of additional state aircraft and the disposal of existing state aircraft until:

1. *All existing aircraft are centralized in the aircraft pool as required by law.*
2. *The state's air transportation needs and existing aircraft resources have been evaluated.*

The Department of Community Affairs disagreed with the recommendations because they believe they need a twin engine, all weather aircraft (page 73). We believe the acquisition of such an aircraft should not be made until such time that the transfer of the Department of Highways Turbo Commander has been resolved. It is a twin engine, all weather aircraft (page 16).

CHAPTER VI. LEASE VERSUS PURCHASE - COST COMPARISONS

Once the Aeronautics Division has determined the need for a particular type of aircraft there are several methods by which it can meet these needs. The division could purchase, lease, lease with option to purchase, rent, or charter the aircraft. The most advantageous alternative depends upon many factors. Rental or charter of aircraft may be the most advantageous method to meet immediate short term air transportation needs while leasing or purchasing may be advantageous for long term needs (page 62).

Aside from the fact that the division does not know the extent to which it needs new aircraft (as discussed on page S-7), the division also has not adequately determined whether lease is better than purchase, or even rental, and has not adequately compared the costs of the various alternatives. Consequently, the division does not know which alternatives

are the best--most economical and efficient in terms of current needs (page 62).

We have found in the past that other state agencies have also requested funds for major equipment acquisition without comparing the costs of alternative methods (pages 68 and 69).

State agencies should be required to compare the costs of alternative methods using life cycle cost analysis before requesting funds for equipment procurement. Such cost comparisons should be submitted to the Governor's Office of Budget and Program Planning and the legislature for consideration in evaluating budget requests for the acquisition of major equipment items (page 69). Consequently, we are recommending (page 69) that:

1. *The Aeronautics Division prepare life cycle lease versus purchase cost comparisons for various aircraft it needs before purchasing or leasing additional aircraft.*
2. *The Governor's Office of Budget and Program Planning require all state agencies to submit life cycle analysis and comparisons of lease versus purchase to its office in support of all budget requests for major equipment items.*

The Department of Community Affairs (page 74) and the Governor's Office of Budget and Program Planning (page 85) agreed with the recommendations.

APPOINTIVE AND ADMINISTRATIVE OFFICIALS

DEPARTMENT OF COMMUNITY AFFAIRS

Harold Fryslie	Director
Martin Mangan	Deputy Director

AERONAUTICS DIVISION

Michael Ferguson	Administrator
James White	Chief, Air Transportation Bureau

Chapter I

INTRODUCTION

This report addresses the implementation of Montana's aircraft pool law. The report discusses the effectiveness of the aircraft pool law and several areas where benefits are available through improvements in the state's aircraft operations.

ORGANIZATION OF THE REPORT

This report is presented in six chapters.

Chapter I presents an introduction to the report and summarizes the objectives and scope of the review.

Chapter II presents a background of the aircraft pool law.

Chapter III summarizes the state's present aircraft operations, discusses the degree to which the aircraft pool law has been implemented, and also discusses problems that could be encountered in the pooling of state aircraft. Recommendations are made to improve the effectiveness of the aircraft pool law.

Chapter IV discusses state employees' use of the least costly mode of transportation when traveling on state business and includes recommendations intended to result in employees use of the least costly mode.

Chapter V discusses the Aeronautics Division's planning for the state's aircraft operations and determination of the state's aircraft needs. The chapter includes recommendations to improve the planning process and the determination of state aircraft needs.

Chapter VI compares the costs of leasing aircraft with the costs of purchasing aircraft. The chapter includes recommendations to improve the state's determination of whether it should lease or buy.

OBJECTIVES OF THE AUDIT

The objectives of our review were:

1. To evaluate the effectiveness of Montana's aircraft pool law.
2. To determine whether the state's aircraft were being operated effectively and efficiently.

SCOPE OF THE AUDIT

The review focused upon the Aeronautics Division's implementation of the aircraft pool law and upon the efficiency of aircraft operations by the Aeronautics Division and other state agencies. We did not review other responsibilities of the Aeronautics Division such as pilot and aircraft registration, the operation of state airports, or assistance provided to local governments for the construction and operation of airports. We also did not review the aircraft operations of the Department of Military Affairs because its aircraft are owned by the federal government and are intended only for military use.

Our audit did not encompass the internal financial transactions of the Aeronautics Division or other agencies which operate aircraft. In 1976 a CPA firm under contract with the Office of the Legislative Auditor completed a financial/compliance audit of the Department of Community Affairs which includes the Aeronautics Division.

Chapter II

BACKGROUND ON AIRCRAFT POOL

In 1974 the Legislature enacted Senate Bill 508 (Chapter 378, Laws of 1974) requiring the Department of Community Affairs to be the custodian of all airplanes owned or leased by the state. The bill is codified as Sections 1-1101 through 1-1105, R.C.M. 1947. Throughout this report we refer to the bill as the aircraft pool law. A state aircraft pool is the collection of all state aircraft under one administrative agency for the common use of all state agencies. The law culminated several years' efforts by the former Aeronautics Commission to establish a state aircraft pool.

In 1962 the Aeronautics Commission purchased an aircraft and began providing air transportation for the Governor and other state officials. The commission purchased a second aircraft in May 1969. Also in 1969 the commission formalized its air transportation policy with a written policy stating that "... other state agencies may utilize these aircraft on a reimbursable basis with rates set forth in Montana Aeronautics service charges for air transportation for state departments."

The Executive Reorganization Act of 1971 renamed the Aeronautics Commission the Board of Aeronautics and vested in it the commission's quasi-judicial and quasi-legislative responsibilities pertaining to the licensing of air carriers. The act transferred the commission's other responsibilities to the Department of Intergovernmental Relations. The Governor's Executive Order 4-72 implementing the aeronautics portion of the Executive Reorganization Act established an Aeronautics Division within the Department of Intergovernmental Relations and placed the state's aeronautical responsibilities within such division. In 1975 the Legislature changed the name of the Department of Intergovernmental

Relations to the Department of Community Affairs (Section 1, Chapter 213, Laws of 1975). The state's aeronautical activities remain with the Aeronautics Division (hereafter referred to as the division) of the Department of Community Affairs.

By May 1972 four state agencies were operating 14 aircraft: the Aeronautics Commission operated three aircraft, the Department of Highways operated one aircraft, the Department of Fish and Game operated six aircraft and the Department of Natural Resources and Conservation operated four aircraft. In September 1973 the Department of Livestock obtained a helicopter on loan from the federal government and became the fifth state department operating aircraft.

Prior to 1972 the various agencies operating aircraft made their aircraft available to each other and to other state agencies but there apparently were no concerted efforts to centralize the state's aircraft operations. In March 1972 the then existing Aeronautics Commission internally discussed the possibilities of coordinating state aeronautical activities and the creation of a state aircraft pool. The commission director also discussed the concept with the director of the Department of Administration which subsequently conducted an aircraft utilization cost study. The department completed the study in May 1972 and recommended that the state have a central dispatcher to coordinate all state aircraft operations. The Aeronautics Commission reviewed the study and submitted it to the Governor's office for review.

Implementation of the Executive Reorganization Act in August 1972 not only transferred the state's aeronautical responsibilities to the Department of Intergovernmental Relations (later renamed the Department of Community Affairs) but also specifically established an air transportation

program within the division. The stated purpose of the air transportation program was to coordinate and provide for the fullest possible utilization of all state aircraft. The program was to furnish air transportation, including special purpose aircraft, for various departments of state government and maintain a central dispatching service to notify agencies of the availability of state air transportation and scheduling. Although the Executive Order implementing the Executive Reorganization Act did not transfer the state's aircraft to the Aeronautics Division, it apparently intended to improve the utilization of state aircraft by state agencies through centralized coordination.

In September 1972 the Governor asked the division to undertake measures necessary to centralize all aircraft and pilots under the general administrative control of the Aeronautics Division. The division began implementing the Governor's request by requesting the other three agencies operating aircraft to cooperate. In January 1973 the division established an Air Transportation Bureau and notified all state agencies that the bureau administered the state aircraft pool and coordinated the use of state owned aircraft. State agencies needing air transportation services were instructed to call the transportation bureau for the necessary arrangements.

Despite the division's attempts to establish a state aircraft pool and coordinate state aeronautical activities the Governor's request was not successfully implemented. The Aeronautics Division had two aircraft and was providing air transportation for the Governor and other state employees but all the other agencies that previously owned and operated their own aircraft maintained possession and control of their aircraft and pilots. In some instances the agencies made their aircraft available

to the division while in other instances they did not. For example, the Department of Highways made its aircraft and pilot available to the division and it was used by other agencies. The Department of Fish and Game also made its Helena based aircraft available to the division for other agency use, but did not relocate its three other aircraft to Helena because they were needed in the field. Similarly, the Department of Natural Resources and Conservation's aircraft--which were also stationed in the field--were not made available to the division for other agency use until some time later.

While the various agencies operating aircraft attempted to cooperate there were apparently some problems. Department of Highways officials said they were unable to complete the department's aerial photography work because the aircraft was not always available when needed because it was being used by other agencies. The Department of Fish and Game pilot said his flight schedules were frequently changed by the division to accommodate other users. In addition, the Department of Natural Resources and Conservation's pilot said he had requested aircraft from the pool for fire patrol flights but was unable to obtain the aircraft because none were available when needed. In summary, the pilots for the three other agencies which then operated aircraft said the state's first attempt at aircraft pooling was unsatisfactory. Consequently, the desired central coordination of all state aircraft intended by the Governor and sought by the division was not attained.

The 1974 Legislature addressed the aircraft pool issue by providing a legal basis for achieving central dispatch and coordination of state aircraft. The Legislature enacted Chapter 378, Laws of 1974 (Section 1-1101, through Section 1-1105, R.C.M. 1947) which requires the Department

of Community Affairs to be the custodian of all airplanes owned or leased by the state of Montana, its boards, commissions, or agencies. The law gives the department the power and authority to formulate and enforce reasonable rules and regulations governing the use and operation of all aircraft under its control and authorizes the department to encourage and coordinate the use of such aircraft by individual state agencies.

While the law specifically requires the division to be custodian of all state aircraft, it also stipulates (a) that agencies requiring especially equipped aircraft (such as for aerial photography and predator control) shall have priority use of such aircraft, and (b) that any part of the aircraft pool law which adversely affected an agency so as to jeopardize its federal funds would not apply to that agency.

It is evident that the Legislature intended to centralize all state aircraft in a centralized pool administered by the division. At the same time, the Legislature wanted to insure that no agency would lose its federal funding because of the requirement for centralization of all the aircraft.

Chapter III

IMPLEMENTATION OF THE AIRCRAFT POOL LAW

The aircraft pool law, Section 1-1101, R.C.M. 1947, requires the Department of Community Affairs to be the custodian of all state airplanes. Although the law does not specifically state its purpose nor the purpose of the aircraft pool it envisioned, it is obvious that the law intended to improve the effectiveness and efficiency of state aircraft operations by centralizing control over the state's aircraft. However, this has not happened and there has been greater separation and proliferation of aircraft operations among state agencies. Subsequent to the passage of the aircraft pool law in 1974, those aircraft operations which were at least somewhat centralized--Department of Highways and Department of Fish and Game--were taken back by those agencies, presumably because of the problems that had been experienced. Consequently, five state agencies (excluding the Department of Military Affairs -- the air and army national guard) independently administered, scheduled, maintained and operated 17 aircraft as follows:

Illustration 3.1
SUMMARY OF STATE AIRCRAFT OPERATIONS
DURING FISCAL YEAR 1975-76

Agency	Cost of Aircraft Operations[1]	Number of Aircraft Operated	Hours Aircraft Flown	Number of Pilots[2]
Aeronautics Division	$156,000	6	1,583*	10
Department of Fish and Game	150,342	6	1,513*	10
Department of Natural Resources and Conservation	11,838	2	369	1
Department of Livestock	27,934	2	577	1
Department of Highways	76,814	1	341	1
Total	$422,928	17	4,383	23

*Does not include hours chartered from private air charter firms: Aeronautics Division, 320 hours; Department of Fish and Game, 2,997 hours.

[1]Excludes the costs of pilot's salary, includes the costs of rented and chartered aircraft. Some of these costs were reimbursed by the federal government.

[2]Number of pilots includes all agency personnel who are qualified to fly the respective aircraft operated by the agency. In some cases, these personnel have other primary duties and fly only when needed, e.g., game wardens.

Source: Compiled by the Office of the Legislative Auditor from information obtained from the five agencies.

The preceding illustration depicts the extent of state aircraft operations during fiscal year 1975-76. There have been some changes since that time--the number of aircraft leased by the division has changed and one of the Department of Livestock helicopters was destroyed in a crash. The current number of aircraft and pilots is depicted by the following illustration:

Illustration 3.2
STATE AIRCRAFT AND PILOTS
AS OF JANUARY 25, 1977

Agency	Number	
	Aircraft	Pilots
Aeronautics Division	5	10
Department of Fish and Game	6	10
Department of Natural Resources and Conservation	2	1
Department of Livestock	1	2
Department of Highways	1	1
Total	15	24

Source: Compiled by the Office of the Legislative Auditor from information obtained from the five agencies.

Since state agencies have not transferred their aircraft to the Aeronautics Division, the state aircraft pool consists only of the five aircraft operated by the Aeronautics Division. Although other state agencies have not transferred their aircraft to the division, they have cooperated with the division in aircraft pool operations. For example, the Department of Natural Resources and Conservation relocated its chief pilot to Helena in November of 1975 and the pilot flew several flights for the Aeronautics Division's aircraft pool. The Department of Natural Resources and Conservation also moved its Missoula based aircraft to Helena during the period November 1975 through May 1976 and made it available to the aircraft pool. Since the department uses its aircraft

for fire patrol flights during the forest fire season it moved the aircraft back to Missoula in June 1976 but returned it to Helena in September 1976 and again made it available to the aircraft pool.

Although the Department of Fish and Game also has not transferred its aircraft to the division the department has made its Helena based aircraft and pilots available to the aircraft pool and other state agencies. In addition the department pilots have flown Aeronautics Division aircraft for the aircraft pool. The Department of Highways also has not transferred its aircraft to the Aeronautics Division. However, the department occasionally made flights for the Governor when requested to do so by the Aeronautics Division and uses its aircraft to take aerial photographs for other state agencies.

STATE AGENCY AIRCRAFT OPERATIONS

Illustration 3.3 on page 11 lists the aircraft the state agencies operated during fiscal year 1975-76 and provides general information about each aircraft. The nature and extent of the aircraft operations conducted by the various agencies depicted in the illustration are discussed in greater detail in the paragraphs which follow the illustration.

Illustration 3.3
LIST OF AIRCRAFT OPERATED BY
STATE AGENCIES DURING FISCAL YEAR 1975-76

Custodian Agency and Aircraft	Year Aircraft Manufactured	Date Acquired by State	Acquisition Cost	Primary Use	Passenger Capacity Excluding Pilot	Hours Flown During FY 1976	Base Location
1. Aeronautics Division							
Beech Queen Air	1967	4/13/68	$192,000	Passenger service for aircraft pool	5	269	Helena
Beech A-36	1975	7/ 1/75	84,000	Passenger service for aircraft pool	5	556	Helena
Cessna T-41	1967	4/ 4/73	5,000[1]	Transportation of Aeronautics employees	3	185	Helena
Beech Duke	1974	10/18/74	Rented	Passenger service for aircraft pool	5	314	Helena
Beech Baron[2]	1973	Rented when needed	Rented when needed	Passenger service for aircraft pool	5	83	Helena
Cessna 310[2]	1974	Rented when needed	Rented when needed	Passenger service for aircraft pool	5	108	Helena
2. Dept. of Fish and Game							
Cessna 180	1963	4/15/63	22,000	Game surveys and transportation of Fish and Game employees	3	247	Helena
Piper PA-18	1970	11/14/69	15,000	Game surveys	1	109	Helena[3]
Piper PA-18	1973	7/27/73	19,000	Game surveys	1	362	Glasgow
Piper PA-18	1973	7/27/73	19,000	Game surveys	1	375	Billings
Bell Helicopter	1962	3/30/62	49,000	Game surveys	1	270	Helena
Bell Helicopter	1964	5/ 4/74	7,500[1]	Game surveys	1	150	Helena
3. Dept. of Natural Resources and Conservation							
Cessna 180-H	1970	7/20/70	20.000	Fire patrol flights	3	298	Msla/Helena
DeHavilland Beaver	1953	2/ 8/72	3,000[1]	Fire patrol flights	3	71	Kalispell
4. Dept. of Highways							
Turbo Commander 680-W	1968	5/18/70	294,000	Transportation of Highways employees	7[4]	341	Helena
5. Dept. of Livestock							
Bell Helicopter[5]	1964	2/25/76	10,500[1]	Predator control	1	-0-	Helena
Bell Helicopter	1963	11/ 1/73	4,000[1]	Predator control	1	577	Lewistown[6]

[1]Costs of rehabilitation of aircraft loaned by the federal government.
[2]These aircraft were rented during fiscal year 1975-76 but are no longer available to the state. As of January 24, 1977, the Aeronautics Division was renting a Cessna 340.
[3]This aircraft was moved to Great Falls in December 1976.
[4]The Turbo Commander can accommodate up to seven passengers; however, two of the seats have been removed to provide space for the camera and related equipment used for aerial photography. The seats can be replaced when the aircraft is being used for other purposes.
[5]This aircraft was not flown during fiscal year 1975-76 because it was being rehabilitated after acquiring it on loan from the federal government. This aircraft was destroyed in a crash on January 5, 1977.
[6]This aircraft was moved to Forsyth in July 1976.

Source: Compiled by the Office of the Legislative Auditor from information obtained from the five agencies.

Aeronautics Division

The Aeronautics Division operated six aircraft during fiscal year 1975-76. The state owned two of the aircraft, obtained one on loan from the U.S. Defense Civil Preparedness Agency, and rented three on an hourly basis as needed. During fiscal year 1975-76 the Aeronautics Division used its aircraft primarily for the transportation of state employees including division employees as shown in illustration 3.4.

Illustration 3.4
USE OF AERONAUTICS DIVISION AIRCRAFT
DURING FISCAL YEAR 1975-76

Aircraft	Hours Flown For: Transportation of Agency Employees	Transportation of Aeronautics Division Employees	Transportation of the State Governor	Administration, Pilot Proficiency and Other Purposes	Total
1. Beech A-36	253	191	-0-	112	556
2. Beech Queen Air	207	-0-	46	16	269
3. Cessna T-41	33	83	-0-	69	185
4. Beech Duke (Rental)	156	-0-	146	12	314
5. Beech Baron (Rental)	80	-0-	-0-	3	83
6. Cessna 310 (Rental)	105	-0-	3	-0-	108
Other Rental Aircraft	59	6	-0-	3	68
Total	893*	280	195*	215	1,583*
Percent of Total	56	18	12	14	100

*In addition to the hours shown, the division chartered about 320 hours of flight services from private charter firms during the year. These charter flights were primarily for the transportation of state employees and the Governor.

Source: Compiled by the Office of the Legislative Auditor from information obtained from the Aeronautics Division.

The aircraft operated by the Aeronautics Division constitute the state aircraft pool which the division operates much the same as a private aircraft charter service. Employees of all state agencies may request air transportation by calling the division. Weather permitting, the division will fly state employees wherever they need to go, day or night, seven days a week. The division tries to fill every request; when it needs additional aircraft it either rents an aircraft to be flown by a division pilot or charters an aircraft and pilot from private aircraft charter firms.

The division employs one pilot full-time and one part-time. Eight other employees who have other duties also fly the division's aircraft when necessary. In addition, pilots from the departments of Fish and Game and Natural Resources and Conservation occasionally fly the division's aircraft.

Department of Fish and Game

The Department of Fish and Game uses its six aircraft primarily for game studies, aerial fish plants, and fish and game law enforcement. The department also uses its Cessna 180 for passenger transportation. Illustration 3.5 shows the Department of Fish and Game's use of the six aircraft during fiscal year 1975-76.

Illustration 3.5
USE OF DEPARTMENT OF FISH AND GAME AIRCRAFT
DURING FISCAL YEAR 1975-76

Aircraft	Hours Flown For: Fish and Game Management	Transportation of Department of Fish and Game Employees	Aeronautics Division Aircraft Pool Passenger Service	Total
1. Cessna 180	96	138	13	247
2. Piper Super Cub	109	-0-	-0-	109
3. Piper Super Cub	362	-0-	-0-	362
4. Piper Super Cub	375	-0-	-0-	375
5. Bell Helicopter	150	-0-	-0-	150
6. Bell Helicopter	270	-0-	-0-	270
Total	1,362*	138	13	1,513*
Percent of Total	90	9	1	100

*In addition to the hours shown, the Department of Fish and Game chartered about 2,997 hours of flight services from private charter firms during the year. These charter flights were primarily for fish and game management.

Source: Compiled by the Office of the Legislative Auditor from information obtained from the Department of Fish and Game.

The Department of Fish and Game stations its Super Cubs in Billings, Glasgow, and Great Falls. Both of the department's helicopters are stationed in Helena.

The Department of Fish and Game employs two full-time pilots. In addition, eight other employees stationed throughout the state are licensed pilots and fly the department's aircraft when necessary.

Department of Natural Resources and Conservation

The Department of Natural Resources and Conservation operates two aircraft, a Cessna 180 and a DeHavilland Beaver. Both aircraft are used primarily for fire patrol flights but the Cessna 180 is also used for passenger flights. Both of the department's aircraft are equipped with radios for communicating with fire crews on the ground and with other fire control aircraft. Illustration 3.6 shows the use of the Department of Natural Resources and Conservation's aircraft during fiscal year 1975-76:

Illustration 3.6
USE OF DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION AIRCRAFT
DURING FISCAL YEAR 1975-76

Aircraft	Hours Flown For: Fire Patrol Flights	Insect Infestation Studies	Passenger Service for DNRC Employees	Passenger Service for Aeronautics Division Aircraft Pool	Total
1. Cessna 180	230	16	24	28	298
2. DeHavilland Beaver	71	-0-	-0-	-0-	71
Total	301	16	24	28	369
Percent of Total	82	4	6	8	100

Source: Compiled by the Office of the Legislative Auditor from information obtained from the Department of Natural Resources and Conservation.

The department employs one full-time pilot and two additional pilots during the summer fire season. The full-time pilot is responsible for coordinating and supervising the department's aircraft operations and the summer pilots fly the fire patrol flights.

Department of Livestock

The Department of Livestock operates two helicopters. Both were obtained on loan from the federal government and both were used as aerial platforms for shooting coyotes in conjunction with the department's predator control program.

The department acquired one of the helicopters in 1973 and it was flown 577 hours during fiscal year 1975-76. The other was acquired in February 1976 and was not flown during fiscal year 1975-76 because it was being rehabilitated. This helicopter was subsequently destroyed in a crash on January 5, 1977. It was stationed in Helena. The other helicopter was stationed in Lewistown during fiscal year 1975-76 and is presently stationed in Forsyth. The department employed one full-time pilot during fiscal year 1975-76 and currently employs two full-time pilots.

Department of Highways

The Department of Highways operates one aircraft, a twin engine Turbo Commander. The aircraft is an all weather, pressurized, propeller driven, turbine engine aircraft that has a capacity of seven passengers. The Department of Highways purchased the aircraft for $293,675 in 1970 and had a camera port (a window in the bottom of the aircraft's fuselage) installed in the aircraft so that it could be used for aerial photography. The Turbo Commander is also equipped with a radio for air-to-ground

communication and has a cruise speed of about 300 miles per hour. It is the fastest aircraft operated by the state and is based in Helena.

Illustration 3.7 shows the use of the Turbo Commander during fiscal year 1975-76. The department employs one full-time pilot.

Illustration 3.7
USE OF THE DEPARTMENT OF HIGHWAYS' TURBO COMMANDER AIRCRAFT DURING FISCAL YEAR 1975-76

Purpose of Flight	Flight Hours	Percent of Total Flight Hours
Passenger service for Department of Highways Employees	207	61
Passenger Service for the State Governor	41	12
Passenger Service for the Aeronautics Division's Aircraft Pool	4	1
Aerial Photography	84	25
Other	5	1
Total	341	100

Source: Compiled by the Office of the Legislative Auditor from information obtained from the Department of Highways.

POTENTIAL BENEFITS OF AIRCRAFT POOLING

The state could meet its aircraft needs more efficiently and effectively if the centralized control and coordination of aircraft envisioned by the aircraft pool law were accomplished. The greatest overall benefit would result from the central management and control of the state's aircraft operations. Areas such as aircraft insurance, maintenance, acquisition, disposal and operation of state aircraft would be handled by an administrative function which has been established and staffed to administer an aeronautics function. This would avert the need for other state agencies to develop and maintain a similar aeronautics capability. In addition to such general benefits, specific benefits would also be

available. Specific benefits from an aircraft pool are available in the areas discussed below.

Passenger Service for Department of Highways Employees

The Department of Highways uses its aircraft, the Turbo Commander, primarily for passenger service for highway department employees. During fiscal year 1975-76 the department flew its aircraft 341 hours: 207 hours or 61 percent of these were for passenger service for departmental employees. When departmental employees need air transportation they call the Department of Highways pilot. If the pilot has no other flights scheduled he makes the requested flights. If the pilot has other flights scheduled he either reschedules the flights, advises the employees he can transport them another day and schedules a flight for that day, or refers the employees to the Aeronautics Division.

During fiscal year 1975-76 about 94 percent of the department's passenger flights were for five or fewer passengers. The number of passengers on each flight is important since the fewer the passengers, the greater the possibility of using a smaller, more efficient aircraft--weather permitting--than the more expensive seven-passenger Turbo Commander. Illustration 3.8 shows the number of passenger flights made during fiscal year 1975-76:

Illustration 3.8
SUMMARY OF PASSENGER FLIGHTS ON
THE DEPARTMENT OF HIGHWAYS AIRCRAFT
DURING FISCAL YEAR 1975-76*

Number of Passengers	Number of Flights*	Percent of Flights	Cumulative Percentage
1	10	10	10
2	20	21	31
3	23	24	55
4	16	16	71
5	22	23	94
6	5	5	99
7	1	1	100
Total	97	100	

*These statistics exclude those flights made specifically for aerial photography and transportation of the Governor.

Source: Compiled by the Office of the Legislative Auditor from information obtained from the Department of Highways.

The Turbo Commander costs about $225 per hour excluding pilot to operate. In contrast the Beech A-36, a single engine, five passenger aircraft operated by the Aeronautics Division, costs about $59 per hour excluding pilot to operate. However, the Turbo Commander is faster than the A-36. The Turbo Commander cruises at 300 miles per hour in comparison to the A-36 at 190 miles per hour. At these speeds the A-36 takes about 20 minutes more to fly from Helena to Billings (the Turbo Commander's most frequent destination) than the Turbo Commander.

Central control and coordination over all state aircraft as envisioned by the aircraft pool law would have made more efficient travel possible. The Department of Highways may have been able to save as much as $20,300 during fiscal year 1975-76 for the transportation of its employees if such travel had been in the A-36 for passenger flights with five or less passengers. If the Department of Highways had used a Cessna 180 similar to the one operated by the Department of Natural Resources and Conservation

for flights with three or less fewer passengers and the Aeronautics Division's A-36 for flights of four or five passengers the savings to the department would have been even more--about $24,400. These estimates are based upon the costs of operating the various aircraft, the aircraft speeds, the pilot's salary, and the costs of the passengers' salaries while traveling.

While it is possible that as much as 94 percent of the passenger flights made in the Turbo Commander could have been made in smaller, more efficient aircraft, there are instances where only a twin engine, all weather aircraft such as the Turbo Commander had to be used. Both the A-36 and the Cessna 180 are single engine aircraft and neither is equipped to fly in bad weather. In addition, the Aeronautics Division's passenger transportation policies prohibit nighttime passenger flights in single engine aircraft. This policy was established as a safety precaution. For example, engine failure in a single engine aircraft such as the A-36 or Cessna 180 requires an immediate emergency landing, whereas a twin engine aircraft provides the pilot with an opportunity to continue flight. This is particularly important at night and in bad weather.

Because information concerning weather conditions on the dates of the Department of Highways' passenger flights was not readily available, we could not determine how many of the Turbo Commander flights could have been made in smaller, more efficient single engine aircraft. Regardless of the number of flights that could have been made in such aircraft, all of the Department of Highways' passenger flights could have been made through the division's aircraft pool since the division has both single engine and twin engine aircraft available to it and is

in a position to select an aircraft suitable to the passenger and cargo load and the weather and safety requirements of each particular flight. In addition to its own aircraft the Aeronautics Division can supplement the pool aircraft by chartering whatever aircraft it might need. The important point is that the Aeronautics Division was established specifically to provide such transportation services whereas the Department of Highways was not.

Aerial Photography

The Department of Highways uses its Turbo Commander for aerial photography as well as for passenger service. As shown on page 17 the department flew the Turbo Commander 84 hours for aerial photography purposes during fiscal year 1975-76. The aerial photography flights were made on 28 days during the year and accounted for 25 percent of the department's use of the Turbo Commander.

The department uses aerial photographs for selecting routes for proposed highways, preparing topographical maps that may be used for estimating cuts and fills to be made during highway construction, documenting highway construction progress and problems, and analyzing traffic patterns and highway design problems that are causing traffic congestion. Also the department sometimes is able to use aerial photographs as documentary evidence of before and/or after conditions in lawsuits involving highway rights of way.

The Department of Highways may be able to use a less costly aircraft for its aerial photography. We contacted seven private aerial photography firms and the aerial photography sections of the Idaho, North Dakota, Utah, Washington, and Wyoming state highway departments, and found that these firms and states generally do not use aircraft as sophisticated or

as costly as the Turbo Commander for aerial photography, Five of the seven private firms used a turbocharged Cessna 206. Two of these five firms are located in Montana; one in Billings and one in Missoula. One of the seven private firms used a turbocharged Cessna 180 similar to the turbocharged Cessna 180 owned and operated by Montana's Department of Fish and Game. One of the private firms has several aircraft ranging from a Cessna 180 to a Lear jet and does aerial photography in Montana and all over the world.

Two of the private firms do aerial photography for the Utah State Highway Department similar to the photography work done by the Montana Department of Highways. Another one of the private firms does the aerial photography work for the Minnesota Highway Department, and still another of the firms does part of the aerial photography work for the Wyoming Highway Department.

The highway departments for the five other states do aerial photography which is the same or similar to that done in Montana--preconstruction planning, topographical mapping, and city plats. Idaho uses a Piper Apache for its aerial photography, North Dakota uses a Cessna 337, Utah contracts with two private firms, Washington uses a turbocharged Cessna 206, and Wyoming uses an Aero Commander Shrike. All of these aircraft are less expensive to operate than the Turbo Commander.

The turbocharged Cessna 206 costs about $49 per hour to operate and the turbocharged Cessna 180 costs about $36 per hour. In contrast, the Turbo Commander costs about $225 per hour to operate.

One of the firms that does aerial photography work for the Utah Highway Department said they previously used a Turbo Commander but found it too costly and now use a turbocharged Cessna 206.

Department of Highways officials said one of the reasons they need the Turbo Commander for aerial photography is because the aircraft is pressurized and can fly at high altitudes. However, illustration 3.9 shows that the Department of Highways takes most of its aerial photographs at relatively low altitudes. While some high altitude photography is necessary, it does not necessarily have to be done by an aircraft as luxurious and sophisticated as the Turbo Commander. As previously mentioned, other states and private photography firms do not use such an aircraft but rather use less sophisticated, more efficient aircraft.

Illustration 3.9
ALTITUDES AT WHICH THE DEPARTMENT OF HIGHWAYS
TOOK AERIAL PHOTOGRAPHS DURING FISCAL YEAR 1975-76

Altitude Above Terrain Being Photographed*	Estimated Altitude Above Sea Level**	Number of Pictures Taken***	Percent of All Pictures Taken
1,200 feet	7,200 feet	230	6.7
1,500 feet	7,500 feet	401	11.6
1,800 feet	7,800 feet	12	.3
2,400 feet	8,400 feet	135	3.9
3,000 feet	9,000 feet	1,229	35.6
6,000 feet	12,000 feet	1,139	33.0
9,000 feet	15,000 feet	83	2.4
18,000 feet	24,000 feet	88	2.6
20,000 feet	26,000 feet	133	3.9
Total		3,450	100.0

*The Department of Highways does not keep records of the altitudes at which aerial photographs were taken. The altitude above terrain was determined by the Legislative Auditor's Office from the scale of the photographs taken.

**Altitudes above sea level were estimated by the Office of the Legislative Auditor by adding 6,000 feet to the altitude above terrain. We chose 6,000 feet because, with the exception of a few mountain passes, most Montana highways are at elevations under 6,000 feet from sea level.

***Excludes an undetermined number of infrared photographs taken for other agencies but not recorded by the Department of Highways.

Source: Compiled by the Office of the Legislative Auditor from information obtained from the Department of Highways.

The Department of Highways pilot advised us that the Turbo Commander can fly as high as 35,000 feet above sea level for aerial photography flights but is restricted by flight regulations to 25,000 feet for passenger operations. The private aerial photography firms that we contacted said that when necessary they fly the turbocharged Cessna 206 and the turbocharged Cessna 180 as high as 30,000 feet above sea level. Pilots and photographers must wear oxygen masks when flying higher than 12,000 feet above sea level in unpressurized aircraft. Oxygen masks are awkward and uncomfortable but are necessary for high altitude aerial photography work in unpressurized aircraft. Since the Turbo Commander is pressurized, oxygen masks are not required and high altitude aerial photography can be done more comfortably. Nearly all of the private aerial photography firms that we talked to said they would like to use pressurized aircraft for high altitude photography but said they could not afford to do so.

The Department of Highways aerial photography crew said that there are also several other problems which have to be contended with in the use of a single engine, unpressurized aircraft for aerial photography. They mentioned the following:

--Engine oil and exhaust heat stream along the bottom of the fuselage past the camera port distorting the photographs.

--The extremely cold air at high altitudes enters the aircraft through the open camera port.

--Single engine aircraft are more unstable at high altitudes.

--The foregoing problems result in a larger number of re-flights due to unsatisfactory photographs.

--High altitude flight in unpressurized aircraft can cause sinus and ear discomfort and problems for some people.

While the preceding problems are no doubt important, they are not in themselves justification for the use of an aircraft as luxurious and sophisticated as the Turbo Commander.

As previously mentioned, some other states and private aerial photography firms do the same type of aerial photography without Turbo Commander-type aircraft. Officials involved in the aerial photography operations have told us that all of the problems discussed above can and have been overcome so that less sophisticated aircraft, including Cessna 180's and 206's, can be used for aerial photography. In some cases there are factory modifications and kits which solve the problems. The firms and states that use Cessna 206's and 180's said their aircraft are sufficiently stable at both high and low altitudes. One of the firms that uses a Cessna 180 said they flew the plane 600 hours for aerial photography last year and said about 200 hours of this was at altitudes where oxygen was necessary. They said they were not aware of any adverse effects from the use of oxygen. One of the photographers from the state of Washington also said there were no adverse effects from the use of oxygen.

One of the private firms told us they use a Cessna 180 with a Wilde RC-10 camera--the same camera used by the Montana Department of Highways. They said they overcame the weight and size problems of the camera equipment by modifying it.

Regardless of whether the aircraft used is a twin engine or single engine, aircraft that are less costly than the Turbo Commander can be used for aerial photography. North Dakota uses a twin engine Cessna

337, Idaho uses a twin engine Piper Apache, and one of the private firms we talked to uses a twin engine Beech Baron. The important point is that the use of the Turbo Commander cannot be justified on the basis of aerial photography alone. There is no doubt that the twin engine capability of the Turbo Commander provides an extra measure of safety over single engine aircraft. We do not want to infer that safety should be compromised; however, there is no question that less sophisticated aircraft are being used by other states and private aerial photography firms who are undoubtedly also concerned about safety.

The Aeronautics Division is in the business of operating aircraft. If the Department of Highways and other state agencies need aerial photography work, the Aeronautics Division should see that suitable aircraft are available to provide the service required by the agencies. It does not make any sense for this capability to proliferate among the agencies. If all the state's aircraft were in the aircraft pool as envisioned by the aircraft pool law, the Aeronautics Division would be in a position to determine whether one of the state's existing aircraft should be modified for aerial photography, the state should continue to use the Turbo Commander, or whether the purchase of a new, more economical aircraft was justified. Whatever aircraft the state uses for aerial photography will probably have to be a multipurpose aircraft since the state's aerial photography flights are not enough to justify a certain aircraft for that purpose alone. The Aeronautics Division, as administrator of the state's aircraft pool, should be in the best position to evaluate the various needs, consider the safety and performance factors, and select an aircraft that could best meet the combined state needs and safety requirements.

Special Purpose Aircraft

Some of the state's aircraft are used primarily for special purposes. For example, the Department of Fish and Game uses its three Super Cubs and two helicopters primarily for game counts, fish and game law enforcement, and aerial fish plants. The Department of Livestock uses its helicopter exclusively for predator control and the Department of Natural Resources and Conservation uses its aircraft primarily for fire patrol flights.

The fact that the agencies operating these aircraft use them primarily for their own special purposes does not mean that the aircraft cannot be used for other purposes or that they should not be included in the aircraft pool. In the past, these aircraft have been used for other purposes--the Department of Natural Resources and Conservation occasionally has used the Department of Fish and Game's helicopters to fly firefighters to forest fires; the Department of Fish and Game has used its helicopters to help the Department of Institutions locate an escaped convict; the Department of Fish and Game's Super Cubs have been used by the Highway Patrol for aerial traffic patrol; and the Department of Natural Resources and Conservation's Cessna 180 is made available to the aircraft pool when it is not being used for fire patrol flights.

The pooling of special purpose aircraft would provide all state agencies with the special capabilities of these aircraft. This would improve the flexibility, effectiveness and efficiency of the state's aircraft operations. If a state agency has only an occasional need for a special purpose aircraft it could meet this need more effectively by using one of the aircraft in the pool rather than owning and maintaining its own aircraft. In addition, pooling would provide a central coordinator

from whom all state agencies could request special aircraft when needed. Presently a state agency needing a special purpose aircraft must independently find out whether any state agency has such an aircraft, whether it is available, and then make the necessary arrangements for its use. If all the aircraft were pooled agencies needing special purpose aircraft would have only to call the Aeronautics Division. In this regard, the Department of Natural Resources and Conservation is attempting to reach an ongoing agreement for the use of Department of Fish and Game helicopters to fly firefighters to forest fires when needed. If all the state's helicopters were pooled, the Department of Natural Resources and Conservation would request its helicopter services from the Aeronautics Division and the division could determine whether helicopters used by the Department of Fish and Game or the Department of Livestock would best meet the needs of the situation. The helicopters of both departments are essentially the same but are not always based in the same location. In the event of a forest fire the Aeronautics Division may want to dispatch the closest or most readily available helicopter.

Pooling of all aircraft could also provide benefits in other areas. For example, if the Aeronautics Division controlled all of the state's aircraft it could publicize the availability of all the state's aircraft, including the special purpose aircraft, rather than just the passenger aircraft as it has done in the past. Increased awareness of all the state's aircraft services on the part of the various state agencies may improve the overall utilization of state aircraft. Other areas where pooling of all aircraft would provide potential benefits to the state include: centralized dispatch of passenger and cargo flights, centralized billing procedures for the use of all state aircraft, centralized management

of the state's aircraft insurance and maintenance, centralized procurement of aviation fuels, centralized chartering of privately owned aircraft when needed, and centralized planning, management and evaluation of the state's aircraft operations. The unnecessary proliferation of these functions in other state agencies would be curtailed if there were a centralized aircraft pool.

Aviation Fuel

Section 82-1915, R.C.M. 1947, states that the Department of Administration has exclusive power to contract for state supplies, including fuel, and other articles required by state agencies. Section 82-1917(7), R.C.M. 1947, provides that state officers, agencies, or institutions may not purchase any supplies or materials, except on approval of the Department of Administration. Section 82-1913 requires the Department of Administration to advertise and award contracts for purchases to the lowest responsible bidder.

Presently the state agencies independently purchase most of the aviation fuel from local dealers without any contracts and without the benefits of competition. When refueling its planes in Helena the Aeronautics Division merely divides its business and purchases fuel from either of two air service firms. The division has no contract with either firm and pays the prevailing price for fuel when purchased. As of July 1976 the price was 76 cents per gallon from both firms. Similarly, when purchasing fuel at other locations the division buys fuel from an air service firm at the prevailing price. Because some trips are made without refueling at the destination, the Aeronautics Division buys much of its fuel in Helena. The Departments of Natural Resources and Conservation, Livestock, and Highways purchase their fuel in the same manner

as does the Aeronautics Division. However, only one of the two air service firms in Helena sells jet fuel which the Department of Highways plane uses.

At one time, the Department of Fish and Game purchased its aviation fuel in the same manner as does the Aeronautics Division, but in July 1976 the department requested the state Purchasing Division to establish a purchase order for aviation fuel. The Purchasing Division obtained two bids for fuel delivery in Helena. Both bids were lower than the prevailing pump price. The low bid was 71.5 cents per gallon. The Purchasing Division issued a purchase order to the low bidder on August 19, 1976. The order was for an estimated 5,000 gallons of fuel to be delivered as needed from August 19, 1976 to June 30, 1977. The price established in the order was 71.5 cents per gallon which was 4.5 cents per gallon lower than the prevailing price.

The Aeronautics Division has no readily available record of the amounts of aviation fuel the various state agencies purchased at the different airports in Montana during fiscal year 1975-76. However, based upon the actual use of aircraft by the various state agencies, we estimate that the state used about 58,000 gallons of aviation fuel during fiscal year 1976, excluding the jet fuel required by the Department of Highways' Turbo Commander.

Since many of the state's airports have only one fuel dealer, the amounts of fuel purchased in some towns may be too small to justify contracting. Because records of the amounts of fuel purchased at each town are not compiled in a readily available manner, we could not determine the amounts of fuel that could have been purchased under competitive conditions, and therefore we are unable to estimate the actual amount of

savings available. Pooling and central management of state aircraft operations centralized with the Aeronautics Division would provide such information. The division would know the amounts of aviation fuel the state purchases at each location.

Due to the fuel shortages of recent years and the rapidly increasing fuel prices, it may be difficult to obtain a commitment of fuel under a competitively bid contract. The fuel supplier who has the Department of Fish and Game's purchase order said he would be interested in bidding on a fuel contract for all Helena based state aircraft if his fuel allocation established by the Federal Energy Administration were increased. Helena's other fuel supplier said he would have to consider fuel availability and price stability before bidding a contract for all state aircraft.

Both fuel suppliers in Helena said aviation fuel prices have been increasing rapidly and unpredictably and said they would be reluctant to bid a fuel contract for all Helena based state aircraft unless the contract included a price escalation clause allowing them to pass any price increases on to the state. We see no reason such a clause could not be included in state fuel contracts. As an alternative, the contracts could be established on the basis of a discount from prevailing prices. The state has established discount contracts for automotive fuel in the past and it may also be possible for aviation fuel.

We contacted eight other states (Idaho, Wyoming, North Dakota, South Dakota, Oregon, Washington, Utah, and Illinois) and found that none of them presently contract for aviation fuel. Some states believed their aviation fuel volume was too small to warrant contracting, one state said the idea of contracting for aviation fuel had not occurred to them, and one state was concerned about the political implications of

contracting for aviation fuel because the aviation fuel dealers have a representative on the state Aeronautics Commission and the fuel dealers prefer to have the state's business spread around.

Although contracting for aviation fuel is not an established practice in surrounding states, Montana law requires competitive bids and places the responsibility for this on the Department of Administration. The possibility of competitively purchasing aircraft fuels should be explored. This has not been done and consequently, no one knows for certain whether or not firms would bid, whether a better price and suitable terms are possible, and whether a competitive purchase of aviation fuel is in the overall best interest of the state. At the present time, however, the law requires competitive bids and the feasibility of such should be explored by the division and the Department of Administration.

POTENTIAL PROBLEMS WITH AIRCRAFT POOLING

While maximum pooling of state aircraft is a desirable objective there are several areas which could present problems. These potential problems are described below.

Aircraft Purchased with Earmarked Revenue Funds

The Department of Natural Resources and Conservation purchased its Cessna 180 with general fund money; however, the rest of the state owned aircraft were purchased with earmarked revenue funds. Transfer of these aircraft to a centralized aircraft pool poses a potential diversion of funds problem because the aircraft were purchased with the earmarked revenue funds. The nature of this problem and the solution are discussed in the following paragraphs.

Department of Fish and Game

The Department of Fish and Game purchased all of its aircraft, except one helicopter which is on loan from the federal government, with fish and game earmarked revenue funds derived primarily from the sale of sportsmen's licenses. Montana law (Section 26-121, R.C.M. 1947) limits the use of such money to fish and game purposes.

In addition to the state laws, federal laws under which the Department of Fish and Game receives federal funds require the state to agree not to divert receipts from the sale of hunters' and fishermen's licenses to other than fish and game purposes. The federal Dingell-Johnson Act (16 U.S.C.A. §777-777k), authorizes federal funds for fish conservation purposes but requires states to prohibit the diversion of fishermen's license fees to any purpose other than the administration of the Department of Fish and Game in order to be eligible for such federal fish conservation funds. Montana agreed to this antidiversionary requirement through the enactment of Section 26-1401, R.C.M. 1947.

Another federal law, the Pittman-Robertson Act (16 U.S.C.A. §§669-669b, 669c-669i), requires the states to prohibit the diversion of fees from the sale of hunters' licenses for any purpose other than administration of the Department of Fish and Game in order to be eligible for federal wildlife conservation funds. Montana agreed to the federal requirements in Section 26-1122, R.C.M. 1947. In addition, Section 26-1125, R.C.M. 1947, prohibits the use of hunters' license fees for any purposes other than the administration of the Department of Fish and Game.

Federal regulations applicable to the Department of Fish and Game provide that a diversion of state fish and game revenues occurs if a

state fish and game department loses control over the expenditure of any portion of its hunting or sport fishing license revenues or expends such revenues for any purpose other than the administration of the state fish and game department. The regulations also provide that if diversion of funds occurs a state becomes ineligible to receive federal fish and wildlife conservation funds from the date the diversion occurs until the diverted funds are replaced. During fiscal year 1975-76 the Department of Fish and Game received about $2 million in federal grants under the federal fish and wildlife laws.

The Department of Fish and Game occasionally has allowed its aircraft to be used for other than fish and game purposes. For example, within the last year the Department of Fish and Game used one of its helicopters to help the Department of Institutions locate a prisoner who had escaped from the state prison and its Cessna 180 to make passenger flights for employees of the Department of Community Affairs and the Department of Institutions. The respective agencies reimbursed the Department of Fish and Game for the costs of these flights.

The former director of the Department of Fish and Game said the use of the department's aircraft for other than fish and game administration as described in the preceding paragraph was not a diversion of funds because the department was reimbursed for the use of its aircraft and because the department retained control over the aircraft. The former director said he believed a diversion of funds would occur if the Department of Fish and Game transferred its aircraft to the Aeronautics Division because the department would lose control of the aircraft. He expressed the belief that the diversion of funds would occur even if the

Aeronautics Division reimbursed the department each time the aircraft were used for other than fish and game purposes.

The question of diversion of fish and game funds also was raised when the state created its motor pool in 1971. At that time the Department of Fish and Game asked the regional office of the U.S. Department of the Interior which administers the federal fish and game funds whether the transfer of vehicles purchased with state fish and game funds to the state motor pool would constitute a diversion of funds. The regional director for the U.S. Department of the Interior replied that the transfer would be a diversion of funds unless the Department of Fish and Game were repaid for the vehicles or the use of the vehicles were provided free to the department. In other words, the U.S. Department of the Interior reply did not require the Department of Fish and Game to maintain control over the vehicles. To the contrary, the official said that transfer of control would be acceptable if the vehicles were then provided free to the department.

The same rationale applies to the department's aircraft. The aircraft could be transferred to the Aeronautics Division without jeopardizing the federal funds provided the department were paid for the market value of the aircraft or were allowed free use of the aircraft. There are several ways this could be accomplished. First of all, the Aeronautics Division could make a lump sum payment to the department based upon the market value of the aircraft. This would undoubtedly necessitate a legislative appropriation. The same result could be accomplished over a period of time by means of gradual payment in contrast to a lump sum payment. In order to accomplish the payment gradually, the Department of Fish and Game and the Aeronautics Division should

mutually determine the (1) market value, (2) remaining useful life, and (3) an appropriate depreciation rate for the department's aircraft as of the date of transfer. Based on this information, the Aeronautics Division should establish a credit amount in its revolving account for the Department of Fish and Game. Then, as the department uses the aircraft, they would be billed by the division for only operating costs. The costs of depreciation--based upon the market value, remaining useful life and depreciation rate--would not be charged to the department. On the other hand, the department should be paid the depreciation rate as the aircraft are used by other agencies. This would mean, in essence, that the department would have free use of the aircraft until such time that the aircraft was fully depreciated or sold. In the event the division deems it appropriate to sell or otherwise dispose of the aircraft before the aircraft is depreciated, the division would have to pay the Department of Fish and Game for the remaining balance of the credit amount.

The end result of the foregoing process is that the aircraft under the Aeronautics Division's control would be available to all state agencies. The Department of Fish and Game would have priority use of the aircraft for special purposes, and would pay only the operating costs of the aircraft which, of course, they have to pay anyway, as is currently the case. Inasmuch as the department would not be charged for the aircraft, thus having free use of the aircraft, and would be paid for use by other agencies, jeopardy of the federal funds would be avoided.

We discussed the propriety of such an arrangement with the federal audit official responsible for the federal audit of the Department of Fish and Game. He advised us that they would not construe the arrangement to be a violation of the Dingell-Johnson and Pittman-Robertson acts

and so long as the department were not charged depreciation for its use and were paid depreciation for use by other state agencies, there would be no jeopardy of federal funds.

Department of Highways

The Department of Highways purchased its Turbo Commander aircraft with Department of Highways earmarked revenue funds derived primarily from motor fuel taxes and gross vehicle weight fees. Article VIII, Section 6, of the Montana Constitution, restricts the use of highway revenue to construction and maintenance of public streets, roads and bridges and other highway purposes unless such other use is authorized by a three-fifths vote in each house of the legislature.

Unlike the Department of Fish and Game, the Department of Highways is not constrained by federal law prohibiting the diversion of Department of Highways earmarked revenue funds and threatening the loss of federal funds if such diversion occurs. However, the transfer of the Department of Highways aircraft to the Aeronautics Division needs to be accomplished in a manner that will not violate the state constitutional requirement that Department of Highways funds be used only for highway purposes.

The Department of Highways director said he believed the department's aircraft could be transferred to the Aeronautics Division without creating a diversion of the department's funds if the department were reimbursed for the aircraft.

Accordingly, the same arrangement as discussed in connection with the Department of Fish and Game's aircraft could be used to accommodate the transfer of the Department of Highways aircraft--determination of market value, useful life, and depreciation rate, with payment by the department based on costs of operation less depreciation and payment to

the department of the depreciation associated with the use by other agencies.

Although the antidiversion of earmarked revenue requirements pertaining to the aircraft operated by the departments of Fish and Game and Highways and the Aeronautics Division will necessitate special procedures to account for the use of these aircraft and the related reimbursements, these requirements should not preclude the transfer of such aircraft to the Aeronautics Division aircraft pool nor interfere with the use of the aircraft for purposes other than those permitted by the respective earmarked revenue funds with which the aircraft were originally purchased.

Specially Modified and Limited Use Aircraft

As mentioned earlier, some of the state aircraft are modified for special use. The Department of Highways Turbo Commander and the Department of Fish and Game's Cessna 180 have been fitted with camera ports and the Turbo Commander and the Department of Natural Resources and Conservation's Cessna 180 have special radio equipment. The respective departments need these special modifications and equipment to conduct their business. Since they currently have custody and control of the aircraft they are assured that the specially modified or equipped aircraft will be available when they need it. They should have the same assurance from a centralized aircraft pool.

Some aircraft also have a limited use, for example, Piper Super Cubs and helicopters. The Piper Super Cubs and helicopters operated by the Departments of Fish and Game and Livestock may have limited use in a state aircraft pool. The Department of Fish and Game stations its three Super Cubs in the field (Billings, Glasgow, and Great Falls) and its two helicopters in Helena. The Department of Livestock stations one of its

helicopters in Forsyth and one in Helena. Neither the Piper Super Cubs nor the helicopter are particularly useful for routine passenger service. However, as discussed on page 27, other agencies occasionally need and have used the special capabilities of these aircraft.

The pooling of specially modified or limited use aircraft would provide all state agencies with the special capabilities of these aircraft. This would improve the flexibility, effectiveness and efficiency of the state's aircraft operations. For example, the Department of Livestock did not fly its Forsyth-based helicopter during March, April, May and June 1976 because the pilot had died on March 6. If the state's aircraft and pilots had been pooled, the Aeronautics Division may have been able to temporarily assign a pilot to the Department of Livestock or could have moved the helicopter and made it available for statewide use until a new pilot could be hired for the Department of Livestock.

Other state agencies may also have occasional need for specially modified or limited use aircraft. Rather than buy and operate their own special purpose aircraft, state agencies should use the state's existing aircraft whenever possible. Such use by the agencies would not have to interfere with the use by the agencies for which these aircraft were originally modified or purchased.

Provisions of the aircraft pool law (Section 1-1102(2), R.C.M. 1947) provide that agencies for which an aircraft has been specially equipped or modified shall have priority for its use. The law authorizes the Department of Community Affairs to formulate and enforce reasonable rules and regulations governing all aircraft under the control of the division. The division should prepare rules and regulations which specify that certain agencies have priority for the use of aircraft

specially equipped or modified for them. The rules and regulations should permit the division to assign modified or limited use aircraft to state agencies for deployment in the field. However, other agencies should be allowed to use these aircraft when needed. The flexibility for such interagency use would be enhanced by virtue of the fact that one agency--the Aeronautics Division--would be responsible for the scheduling and assignment of the aircraft. Currently this responsibility is dispersed among the five agencies operating aircraft.

Pilots

Some agency aircraft operations require special piloting skills which may not presently be possessed by all state pilots. For example, the Department of Fish and Game's flights for game counts and the Department of Livestock's predator control flights require special skills in mountain and low level flying. The Department of Highways aerial photography flights require special skills in coordinating with the photographer and keeping the aircraft on a precise flight route. Department of Natural Resources and Conservation pilots also must be able to fly precise routes on fire patrol and in some instances as lead aircraft on fire control operations. In addition the department's chief pilot has special training in planning and coordinating fire control operations.

Officials of these departments expressed the view that transfer of their aircraft operations to the division might impair the performance of some of their projects because pilots with the necessary special skills would not always be available when needed. If all of the state's aircraft were centralized in the division as envisioned by the aircraft pool law, it seems reasonable and necessary that all the state's full

time pilots should also be transferred to the division. If this were done the state would probably have the same aircraft and pilot capabilities it now has and there should be no reason that pilots with special skills could not be furnished for projects requiring such skills. In addition, departmental officials generally agreed that pilots in the division could be easily trained in those instances where special skills were necessary but absent.

There are some individuals currently piloting state aircraft who would probably not be transferred to the division. This may be appropriate with respect to the chief pilot for the Department of Natural Resources and Conservation--who spends a considerable amount of his time in an administrative, non-flying capacity--and the chief pilot for the Department of Fish and Game who is also a game warden. This may also be appropriate for the game wardens, who fly the department's Super Cubs (Piper PA-18) in conjunction with their primary duties as game wardens. These individuals are primarily employed as game wardens and as such should remain in the employ of the Department of Fish and Game. There is no reason, however, why such individuals could not fly occasional flights for the aircraft pool when their special piloting skills are needed by another state agency. In such instances the pilot's employing department should be reimbursed for his time while flying for other agencies. There is also no reason why aircraft in the aircraft pool could not be made available to these agencies on a temporary basis with arrangements for the agency pilots to fly the aircraft rather than a division pilot. This would enable the state to take advantage of the pilot's skills in the agency as a supplement to the pilots in the aircraft pool. This would enable

them to continue their aircraft operations and at the same time provide the division with the flexibility to control and use the aircraft to meet other needs.

Pilot pooling should improve the state's utilization of both aircraft and pilots. As previously mentioned, one of the Department of Livestock's helicopters was not used for about four months in 1976 because the pilot had died. Also, the Department of Highways pilot is the only state pilot presently qualified to fly the department's Turbo Commander. If the pilot is on vacation or is sick the aircraft is unused simply because no one else can fly it. If aircraft and pilots were pooled other state pilots could qualify to fly the Turbo Commander and the Department of Highways pilot could qualify to fly other aircraft. The same would be possible with the helicopters. This would improve the utilization and flexibility of both aircraft and pilots.

Pooling the state's full time pilots would make it possible for the Aeronautics Division to assign specially skilled pilots when needed by other agencies. For example, if an agency needed to do some low level flying in the mountains the division could assign one of the pilots who has the necessary special skills. In providing such services to state agencies, the division would be in a position to assess the special piloting skills needed by state agencies and would be able to provide training when necessary.

Funding

If the Aeronautics Division is to administer all of the state's aircraft operations it will need adequate funding for such operations. Presently, the state's aircraft operations are budgeted and appropriated separately in each of the five departments which operate aircraft. The

budget requests by the four state departments, other than the Aeronautics Division, include about $482,000 for aircraft operations in fiscal year 1977-78 and about $506,000 for fiscal year 1978-79. The Aeronautics Division's revolving account budget for aircraft operations should be increased by these amounts so the division can operate all of the state's aircraft. Inasmuch as the other agencies will be required to pay the division for aircraft services obtained, their budgets should not be reduced.

Because collection of services by the Aeronautics Division from its aircraft operations will lag behind its expenditures. the division may also need a general fund appropriation as working capital for the revolving account to absorb the initial impact of its increased operating costs. The amount of appropriation necessary depends upon the amount the division has and needs. The division can determine what amount is needed.

CONCLUSION

The laws governing state aircraft operations require the Department of Community Affairs to be the custodian of all state airplanes and to prepare rules and regulations governing the use of state aircraft. Presently four other state departments, the Departments of Highways, Livestock, Fish and Game, and Natural Resources and Conservation, have custody of and operate state aircraft. Pooling of the state's aircraft would provide for the coordination of the state's aircraft operations, thus improving the effectiveness and efficiency of those operations. Pooling would also provide benefits in the areas of centralized planning to meet the state's aircraft needs, centralized management of the state's aircraft operations and maintenance and centralized fuel procurement.

The four departments that presently operate aircraft should transfer custody of their aircraft and their full time pilots to the Aeronautics Division because pooling of the state's aircraft would improve the flexibility, effectiveness and efficiency of state aircraft operations by establishing central control and coordination of the state's aircraft operations, improving the utilization of the state's aircraft and pilots, and making all of the state's aircraft available to all state agencies.

RECOMMENDATION

We recommend that:

1. *The Departments of Highways, Fish and Game, Livestock, and Natural Resources and Conservation transfer their aircraft and full time pilots to the Aeronautics Division.*
2. *The Department of Community Affairs make formal arrangements with the Department of Highways and Department of Fish and Game to compensate them for the use by other agencies of the aircraft transferred to the division and to allow them use of the transferred aircraft at rates which exclude depreciation until such time as the market value of the aircraft have been amortized.*
3. *The Aeronautics Division prepare rules and regulations for the use of state aircraft including provisions for special assignment of aircraft.*
4. *The Aeronautics Division request the Department of Administration to obtain competitively bid purchase orders for the state's aviation fuel.*
5. *The Aeronautics Division request that its revolving account budget for aircraft operations be increased to include the cost of operating all state aircraft.*

Chapter IV

LEAST COSTLY MODE OF TRANSPORTATION

The Montana Administrative Manual (Section 1-1000.00) recognizes that travel is necessary in the conduct of state business but specifically provides that it is the state's policy that employees will use the least expensive mode of transportation considering both state time and reimbursable travel costs. The section further states that the various state agencies and their employees are responsible for providing effective management controls to assure that state employees adhere to travel laws and regulations.

The least costly mode of transportation depends upon many factors including the distance to be traveled, the number of travelers, the cost of the vehicles or aircraft to be used, the duration of the trip, the costs of meals and lodging, the travelers' salary rates, the speeds of the vehicles or aircraft to be used, the weather, and the time of day the trip is made. Because there are so many variables no one means of transportation will always be the least costly transportation to any given city. An automobile may be the least costly transportation to a given city under some circumstances but a state aircraft may be the least costly transportation to the same city under other circumstances. In some instances an automobile may be the only way--such as in bad weather--while in other instances an aircraft may be the only way to meet a deadline.

As a means of analyzing the possible circumstances we used a computer process to compare the costs of driving with the costs of flying to 21 towns in Montana. Because commercial transportation to some Montana towns is nonexistent or inconvenient due to scheduling or layovers, we

limited our comparisons to two modes of transportation: state automobile and state aircraft.

The costs for state employees to travel to a given city varied as greatly as the factors mentioned above varied. For example, if three state employees whose average grade level is grade 16 need to travel to Miles City and will work there for five hours, the trip would cost the state about $700 if the employees drove a state automobile in contrast to $410 if they flew in the A-36 aircraft operated by the Aeronautics Division. Conversely, if only one employee who is a grade 12 traveled to Miles City to work for eight hours, the trip would cost the state about $240 in a state automobile in contrast to about $400 in the state's A-36 aircraft. Our cost comparisons for other towns yielded similar results; sometimes it is cheaper to fly, sometimes it is cheaper to drive. It depends upon the distances, the number and salary level of employees, and the layover time.

These cost comparisons include the costs of operating the automobile or aircraft, the pilot's salary, the employees' salaries while enroute to and from their destination, and the costs of meals and lodging. The value of the time employees save by flying rather than driving is one of the major factors for determining the least costly mode of transportation. Other organizations sometimes value an employee's worth as 2, 2.5, or 3 times his salary rate. These factors are used when determining the value of the time employees save by flying. These factors are generally based on intangible but important benefits such as more time for the employee to do his primary work, increased productivity, less fatigue, increased mobility, etc. Because there is no generally accepted standard for valuing an employee's time at more than the salary rate and because

it is difficult to measure the intangible factors, we estimated the time that state employees spend while traveling by multiplying the employees' hourly pay rate by the number of hours spent traveling, either flying or driving.

In order to assess the differing circumstances in terms of actual trips by actual employees we selected a sample of actual trips made by state employees in automobiles and a sample of actual trips made by state employees in state aircraft. We compared the costs of flying and driving for ten trips made by state employees in automobiles and ten trips made by state employees in state airplanes. We also discussed the trips with the employees involved. Five of the employees who traveled by automobile said they were unaware of the state aircraft pool when they traveled and would have considered flying had they been aware of the pool. Four of the ten automobile trips sampled could have been made at less cost to the state if the employees had flown rather than driven. The savings available if the employees had flown rather than driven on these four trips ranged from $8 to $158. In addition to these savings, the employees would have had more time for their primary duties rather than merely driving.

On the other hand, six of the ten trips state employees made in state aircraft could have been made at less cost to the state if the employees had driven an automobile rather than flying. Savings available if the employees had driven rather than flying on these six trips ranged from $54 to $115. Again, the intangible benefit of the quicker travel by aircraft should be considered.

The comparisons we made did not disclose any universal conclusion about what means of travel is most efficient: in some instances automobiles

are the least costly means of transportation for some trips while aircraft are the least costly means for others. The comparisons demonstrate, however, that significant savings are available to the state if employees travel by the least costly means.

When flying is less costly than driving, the savings are primarily attributable to time savings. For example, if three state employees drove from Helena to Plentywood and back, they would spend about 60 man-hours driving and each of them would be diverted from their main duties during that time. If the employees' average pay level was grade 14 step 3, the cost of their salaries while driving would be about $540. If the same three employees flew to Plentywood and back in the A-36 aircraft operated by the Aeronautics Division they would spend about 12 man-hours flying and the cost of their salaries while flying would be only about $117 and in addition they would have more time to perform their primary duties.

Because there are so many variables and because state employees made so many trips it was not practical for us to compare the costs for all trips made by state employees during fiscal year 1975-76. Therefore, we did not determine the annual savings that would be available to the state if employees always traveled by the least expensive means. However, it is possible that the savings could be significant because travel expenses for the state during fiscal year 1975-76 alone totaled about $8 million (excluding the cost of lost time and employees' salaries while in transit).

During our discussions with state employees who had traveled by state automobile or by state aircraft, we found that employees encounter

several problems when selecting the best means of travel. These problems are discussed in the following paragraphs.

Some employees were not aware of the Aeronautics Division's aircraft pool or of their eligibility to use it. Under Section 1-1000.00 of the Montana Administrative Manual the various state agencies are responsible for assuring that their employees travel by the least costly means of transportation. As a general rule, state agencies do not have controls to assure that their employees use the least costly means of travel. State agencies should have such controls and should provide their employees with information about different means of travel which are available.

In November 1974 the division prepared and distributed a brochure describing the Duke and the Queen Air and showing fly/drive cost comparisons. Since we found that some employees still are not aware of the aircraft pool, and because the division now has additional aircraft, the division should renew its efforts to publicize its services. The division should prepare current specific information describing its equipment, services and rate so that state agencies can make meaningful decisions about the best means of travel.

Some employees were aware of the aircraft pool but believed flying would cost too much. As we discussed previously, there are many factors affecting the cost of a trip. Consequently, the least costly means of travel must be determined separately for each trip. State agencies should require their employees to compare the costs of the alternative means of transportation before traveling. The Department of Administration should assist agencies by including specific information about the services available from the Aeronautics Division as well as cost comparison guidance for agencies to use in determining the most appropriate means

of travel. This information should be incorporated in the Montana Administrative Manual.

Some employees indicated that they would like to fly but need an automobile once they reach their destination. Although state cars are not available at all Montana towns, the Department of Highways has automobiles--called ride-away cars--at five towns in Montana. These cars are available to state employees in Missoula, Butte, Great Falls, Billings, and Glendive. State employees who use state aircraft and who need a car at their destination can use these cars. The Department of Highways also has cars at other towns which are assigned to specific department employees, but can be used by other state employees on an as available basis. Most of the employees we talked to while discussing trips made in state automobiles were not aware of the Department of Highways' ride-away cars. The Department of Highways and Department of Administration should publicize the availability of ride-away cars so that state departments and their employees will be aware of these cars. The department should also monitor the demand for ride-away cars at each town and keep the size of the ride-away fleets at levels in accordance with demand. If many state employees start flying instead of driving there may be less usage of the Department of Highways' Helena motor pool vehicles. If there are high demands for ride-away cars in other towns, the department may find that some cars should be transferred from Helena to other towns.

CONCLUSION

While the Montana Administrative Manual requires state employees to use the least costly means of transportation, information about the least costly means is not readily available to state agencies and employees.

Agencies and employees do not always know about the availability of aircraft and ride-away cars and the comparative costs of driving versus flying.

The Department of Administration, Department of Highways and the Aeronautics Division should collaborate to establish the information and procedures necessary to ensure that state agencies and employees can determine the least costly means of transportation. The division should prepare current information describing its equipment, services and rates and should periodically update this information when necessary. Since the Department of Administration is responsible for the Montana Administrative Manual, the department should incorporate specific information about the aircraft services available from the division including equipment, services and costs, as well as the availability and cost of ride-away cars. The Department of Administration should provide guidance in the manual for state agencies and employees to use in determining the least costly means of transportation and arranging for such transportation with the division and the Department of Highways. These procedures could include a cost comparison format for employees to use. The ultimate decision of what means to use should be the prerogative of the various state agencies, subject to post-audit.

RECOMMENDATION

We recommend that the Department of Administration collaborate with the Department of Highways and the division to formulate procedures for inclusion in the Montana Administrative Manual governing the comparison of state employee transportation by aircraft pool and automobile.

Chapter V

AIR TRANSPORTATION PLANNING AND AIRCRAFT NEED DETERMINATIONS

AIR TRANSPORTATION PLANNING

In order to achieve their purposes, organizations must be aware of their purposes and objectives and have a plan to achieve them. The plan must be realistic but must also be suitable to result in the achievement of the organization's objectives. Without specific objectives and a plan to meet these objectives management cannot properly control the organization's operations and there is no assurance that the organization's efforts will result in the desired objectives.

The division has not established any formal or written objectives for its Air Transportation Bureau which operates the state's aircraft pool. Although the division has a budgetary plan like other state agencies, the budget plan cannot be construed to be of any use insofar as goals and objectives are concerned. The budget plan is nothing more than just that--a financial plan which appears to expand by a standard 10 percent each year. In other words, the financial plan is not correlated to specific planned services. Since no formal plan of operations has been prepared there is no means by which the Air Transportation Bureau's performance may be evaluated. While the division has information about each flight, e.g., destination, passengers, etc., none of the information had been compiled before our audit in such a manner so as to facilitate planning and evaluation.

At least one state, Iowa, has established objectives for its aircraft pool. These objectives are forward-looking and include statements of the services to be provided in terms of:

--the number of passengers to be served

--the degree of passenger satisfaction to be obtained

--the aircraft safety rate to be attained

--the aircraft utilization to be attained

--the maximum aircraft hourly operating rate to be attained

The division should establish formal, written, and attainable objectives for its Air Transportation Bureau. These objectives should be directly related to specific end results designed to facilitate the operation of a safe, reliable and efficient aircraft pool. The division's objectives would not necessarily have to be the same as Iowa's but should include objectives which would improve the Air Transportation Bureau's performance and efficiency. For example, the division could establish as an objective decreasing the cost of state employees' air travel.

After the division has established objectives for the Air Transportation Bureau, it should develop a plan to meet these objectives. The plan should contain the actions necessary to accomplish the objectives and reduce these actions to a realistic time frame.

After a long range plan has been developed, the division should establish measurement criteria with which to evaluate progress. Measurement criteria such as the average cost of employee travel or the average load factor might be used to periodically evaluate the long range goal of increasing the percentage utilization on each flight. Criteria of this type should be developed to give division management the most accurate and timely information with which to evaluate progress. In addition, a periodic evaluation using the measurement criteria should be scheduled. In this manner, current progress can be compared with the past and the degree of goal accomplishment can be measured.

RECOMMENDATION

We recommend that the Aeronautics Division:

1. *Establish formal, written, and attainable objectives for the Air Transportation Bureau.*
2. *Develop a plan to accomplish these objectives.*
3. *Establish measurement criteria and periodically evaluate Air Transportation Bureau progress.*

DETERMINATION OF STATE AIRCRAFT NEEDS

The division has not identified and quantified the aircraft needs of the state of Montana. Without properly assessing Montana's aircraft needs, the Aeronautics Division does not know if the state presently operates too many or too few aircraft or if the state's aircraft are of the right type. Without such information the division cannot make informed decisions regarding the purchase or lease of additional aircraft or the disposal of existing aircraft.

When determining the state's aircraft needs the division should consider many factors including: the purposes the aircraft will be used for, the number of flights to be made each year, the locations to be flown to, the number of passengers to be carried and the number of passengers per flight, the seasonality of flights, the number of days per year when bad weather limits flying to aircraft equipped for instrument flight and the costs of various aircraft. Some of these factors are discussed in greater detail below.

Flight Projections

One of the primary uses of state aircraft is the transportation of state employees. To provide passenger transportation as efficiently as

possible, the state must know the number of passengers to be flown and the average number of passengers per flight.

The division has not analyzed past passenger statistics nor estimated future passenger loads. As a means of testing the extent of passenger loads we reviewed passenger information for the month of April 1976 and found that 77 percent of the Aeronautics Division's passenger flights for the month were for three or fewer passengers. Passenger statistics for the month are shown in illustration 5.1.

Illustration 5.1
PASSENGER STATISTICS FOR AERONAUTICS DIVISION
PASSENGER FLIGHTS DURING APRIL 1976

	Aircraft						
	Duke	Queen Air	Baron	Cessna 310	A-36	T-41	Total
Passenger Capacity	5	5	5	5	5	3	
Total Flights	6	8	2	8	6	1	31
Total Passengers	15	29	5	21	15	1	86
Average Passengers Per Flight	2.5	3.6	2.5	2.6	2.5	1	2.8
Average Seat Occupancy Rate	50%	73%	50%	53%	50%	33%	56%
Number of Flights With Three or Fewer Passengers	5	4	2	7	5	1	24
Percentage of Flights with Three or Fewer Passengers	83%	50%	100%	87%	83%	100%	77%

Note: These statistics exclude flights for the Governor, for maintenance and training, and the division's use of the aircraft to conduct internal aeronautics business.

Source: Compiled by the Office of the Legislative Auditor from information obtained from the Aeronautics Division.

The number of flights to be made, in all state aircraft, the number of passengers to be carried and the number of passengers per flight are basic information the division should have to determine the number and size of passenger planes the state needs. Generally small planes cost less to operate than larger planes. Based on the April 1976 passenger statistics the state may want to consider the use of smaller planes unless there are reasons to believe that future passenger loads will be different.

The results of our test were basically confirmed by the division which conducted its own study during and after our audit. The division tabulated passenger statistics for the six-month period July 1, 1976 through December 31, 1976, and our analysis of these statistics shows that 69 percent of the division's passenger flights during the six-month period were for three or fewer passengers. The division's statistics included flights for the Governor but excluded flights for maintenance and training and for the conduct of aeronautics business.

Seasonality of Flights

The division has not determined the seasonality of aircraft travel by state employees. Purchase of or leasing aircraft to meet peak demand periods may not be cost effective. It may be more economical for the state to operate only enough aircraft to meet average demands and charter or rent aircraft to meet season peak demands. The division should determine the seasonality of all state flights and should then determine the most efficient mix of owned and chartered aircraft to meet the state's total need.

Weather

Weather is another factor affecting the types of aircraft needed by the state. When visibility is poor due to clouds or fog, flights are limited to aircraft equipped with sufficient instrumentation to allow the pilot to know where he is and fly even though he can not see the ground. The degree of instrumentation varies with the degree of instrument flight capability desired. Small single engine aircraft may be, but frequently are not, equipped for instrument flight while twin engine planes generally are equipped for such flights. Aircraft equipped for instrument flight generally cost more than aircraft without such equipment.

Although it is not possible to make long range predictions as to specific days when the weather will be bad, the U.S. Weather Service does have information available as to the number of clear days that can be expected each month. In addition to this data, the division could accumulate statistics on the number of bad weather flights it makes each year. This information could be used for planning purposes. Since the division has not determined the number of flights the various state agencies need to make in weather which requires instrument flight, the division has no basis for determining the number of instrument flight equipped aircraft it needs. If most state flights are made in bad weather it may be advisable for all of the state's aircraft to be instrument flight equipped. However, if only a few state flights are made in bad weather the state may be better off to operate aircraft without such equipment and charter or rent instrument equipped aircraft when needed.

The division should determine the extent of flying which is done under instrument flight conditions and should determine the most efficient

combination of state owned and chartered aircraft to meet the state's instrument flight needs.

Costs

When determining the number and type of aircraft the state needs, the division should consider the costs of the various aircraft which will meet the state's needs in addition to the usual safety factors. In some instances it may be more optimum from a cost standpoint--given adequate safety--for the division to use private charter aircraft than to operate its own aircraft. We compared private charter firms' passenger flight prices to four cities in Montana with the costs of using division aircraft. The private charter firms' prices were lower than the division's prices. For example, a Helena based private charter firm estimated its price for flying state employees to Miles City in a five passenger single engine aircraft would be $300 if the employees worked in Miles City for 13 hours. We estimate that the cost of flying the division's A-36, a five passenger single engine aircraft, to Miles City on this trip would be about $385. Our estimate for the cost of the A-36 is higher than what the division would charge a state agency because we included overhead (administrative expenses) in our estimates. The Aeronautics Division does not include sufficient overhead costs in its billing rates. In a November 1976 audit report prepared by a CPA firm under contract with the Office of the Legislative Auditor on the financial and compliance aspects of the Department of Community Affairs, the auditor stated that the division's rates for aircraft and personnel were not sufficient to cover the total cost. The auditor recommended that the division increase its rates and add a 10 percent surcharge to cover administrative expenses. In responding to the report the division

stated that rates had been increased and that the 10 percent surcharge had been added to flights the division charters from private charter firms.

Prices we obtained from the private charter firms for flights to three other Montana towns--Dillon, Kalispell, and Wolf Point, also were lower than the costs of flying the Aeronautics Division's A-36 to these towns.

The division administrator said the passenger flight service offered by the private firms is not always comparable to that offered by the division because the private aircraft are not always comparable to the division's aircraft. For example, the local charter firms have no pressurized, all weather aircraft and sometimes did not have any twin engine aircraft. The division administrator also said that for safety reasons the division does not make some flights--such as night flights--in single engine aircraft while some private charter firms will make such flights. Although night flights in single engines are not in violation of the Federal Aviation Administration's charter service operating guidelines, the fact that the aircraft only has one engine means the aircraft cannot continue flight if the engine fails, whereas a twin engine aircraft can--until a safe landing area is found.

Both private charter firms in Helena said they would consider bidding on a large block of flight time if the division should request such bids. Because it may be difficult to predict circumstances surrounding future employee flights, competitive contracts to fly state employees to various destinations around the state would probably have to be open-ended contracts. If the division would assess its past experience and estimate the number of flights made to different cities in Montana per year and the amount of time the employees spend at the different destina-

tions it probably would be possible for the firms to bid fixed prices for flights to each of the frequently visited cities for specific amounts of time. However, the private charter firms said they would want to be guaranteed a minimum number of annual flight hours before bidding on such a contract.

The division should consider the possibility of obtaining competitive bids for passenger flights from private charter firms. The division could then compare the services offered and the costs with its own services and costs and could determine whether the state should contract for a portion of its air transportation needs and, if so, how much should be met through the operation of state owned or leased aircraft.

CONCLUSION

Since the division has not determined the state's aircraft needs, decisions to buy or lease additional aircraft or sell existing aircraft are based upon a feel for the situation rather than quantified and measurable needs.

The Aeronautics Division should determine the state's aircraft needs. Because aircraft are costly the determinations should include long range projections as to what type and quantity of aircraft are needed. The need determinations should be based upon quantifiable output factors such as the number of passengers to be carried, number of flights to be made, weather conditions, use of private charter aircraft, and destinations. Periodically the need determinations should be reviewed and updated to reflect new trends.

RECOMMENDATION

We recommend that the Aeronautics Division defer the acquisition of additional state aircraft and the disposal of existing state aircraft until:

1. *All existing aircraft are centralized in the aircraft pool as required by law.*
2. *The state's air transportation needs and existing aircraft resources have been evaluated.*

Chapter VI

LEASE VERSUS PURCHASE - COST COMPARISONS

Once the Aeronautics Division has determined the need for a particular type of aircraft there are several methods by which it can meet these needs. The division could purchase, lease, lease with option to purchase, rent, or charter the aircraft. The most advantageous alternative depends upon many factors. Rental or charter of aircraft may be the most advantageous method to meet immediate short term air transportation needs while leasing or purchasing may be advantageous for long term needs.

Because the same aircraft can be obtained under any of the different alternatives the most advantageous alternative is largely a matter of cost. When determining the cost of acquiring an aircraft under any of the alternatives, several types of costs must be considered over the useful life of the aircraft. These include purchase costs, lease payments, operating costs, maintenance and repair costs, salvage value and opportunity costs, (i.e., alternative uses of the state money). Determinations of the total cost of owning or leasing an asset over its useful life are frequently called Life Cycle Cost studies. The comparison of the life cycle costs of ownership with the life cycle costs of leasing using Present Value Analysis (a technique of evaluating financial alternatives) results in what is called a Lease versus Purchase study.

Aside from the fact that the division does not know the extent to which it needs new aircraft (as discussed in Chapter V), the division also has not adequately determined whether lease is better than purchase, or even rental. Consequently, the division does not know which alternative is the best--most economical and efficient in terms of current needs. For example, in early December 1976 the division sought bids for a lease

with an option to purchase a twin engine aircraft. The bids were sought strictly on the basis of the lowest bid for a certain type of aircraft without consideration of the differences in operating costs for the different aircraft available from the various bidders. In other words, the bid process focused on the lowest bid overlooking the fact that an aircraft requiring a low initial investment might require a high operating cost. While the lowest bid aircraft may be picked as the least costly purchase, its total cost to own and operate could exceed other alternatives requiring higher initial investment but having lower operating costs over the life of the aircraft. The division rejected all but one of the bids and allowed it to lapse.

The absence of adequate cost alternative studies is also illustrated by the following. In its budget request for the 1977-79 biennium the division requested funds to purchase three aircraft--two twin engine aircraft and one single engine aircraft. The budget request proposed to trade in the Queen Air on one of the twin engine aircraft and discontinue the current rental of the twin engine Duke. The budget request did not justify the purchase of aircraft other than to state that it will allow the state to purchase safer and more cost effective aircraft.

The Aeronautics Division initially did not include life cycle lease versus purchase cost comparisons for any of the aircraft it proposed to purchase. Subsequently, in October 1976, the division submitted to the Governor's Office of Budget and Program Planning lease versus purchase cost comparisons for six aircraft. These cost comparisons were inadequate because they did not consider opportunity costs nor a present value analysis. In addition, the comparisons for five of the aircraft did not include any operating costs (fuel, oil, etc.) and thus are not on a comparable basis with the one comparison which did include such costs.

(The Aeronautics Division obtained the cost comparisons for the five aircraft from the aircraft manufacturer at our request. We had initially sought the comparison from the manufacturer but were advised by the manufacturer that our request had to be made through a dealer-representative. Consequently, we asked the division to request the comparison for us, which they did.)

In addition to the inadequacies of the cost comparisons, the division has not compared the life cycle costs of keeping the Queen Air and the rented Duke with the life cycle costs of purchasing replacement aircraft.

Life cycle cost comparisons can also be used to compare the costs of comparable pieces of equipment. For example, the costs of owning, renting, or leasing, operating and maintaining several similar aircraft which will all meet the same need can be compared with the life cycle cost technique. The Aeronautics Division's request for funds to purchase three aircraft did not name specific aircraft to be purchased. It stated only one single engine aircraft, one light twin engine aircraft, and one pressurized, all weather twin engine aircraft. The division has not compared life cycle costs for similar aircraft in each of the three categories. For example the pressurized, all weather twin engine aircraft was to be purchased as a replacement for the Beechcraft Duke presently rented. The Aeronautics Division has not compared the life cycle costs of various aircraft such as the Cessna 340, Cessna 402, Piper Navajo or the Department of Highways Turbo Commander which could be used to replace the Duke.

The Governor's Office of Budget and Program Planning subsequently reduced the division's request from three to two aircraft. The Governor's budget submitted to the legislature included the request for two aircraft

but also did not include life cycle lease versus purchase cost comparisons for alternatives to purchasing the aircraft. As a consequence, the legislature does not have the information necessary to consider the costs of the alternative methods of obtaining the aircraft and is faced with either simply approving or disapproving the budget request or undertaking the analysis itself.

Inasmuch as the division has not studied the alternatives and does not know which alternatives are best, we examined the alternatives using life cycle cost techniques. The discussion of these alternatives follows.

Beechcraft Duke

In October 1974 the Aeronautics Division entered into a rental agreement for the Beechcraft Duke. The rental rate is $180 per hour for the first ten hours of operation each month, $170 per hour for the second ten hours, and $160 per hour for all additional hours each month. During fiscal year 1975-76 the division used the aircraft about 314 hours and rental payments totaled about $65,000. The rental agreement does not set a specific term for the agreement but it may be terminated upon notice by either the state or the vendor.

We compared the costs of continuing the current Duke rental agreement over a ten year period with the costs of purchasing a used Duke similar to the one the division rents and operating it for ten years. The most advantageous method of obtaining a 1974 model Duke for the next ten years depends upon how much it will be used. During the last two fiscal years the division has flown the Duke about 300 hours per year.

Based on 300 hours of use during a year, our life cycle analysis showed that it would cost about $767,000 to rent the 1974 Duke over a ten year period, while outright purchase and operation of the aircraft

for the same period would be about $664,000. In contrast a new--1976--Duke could be purchased and operated over the period for about $848,000.

Since both the Duke and the Department of Highways Turbo Commander are twin engine, pressurized, all weather aircraft, we also analyzed the operation of the Turbo Commander--currently owned by the state--over the same ten year period. In contrast to the $767,000 necessary to continue to rent and operate the Duke and the $664,000 necessary to purchase and operate it, the Turbo Commander would cost about $602,000. Based on this life cycle analysis, and assuming that the division needs both the Duke and the Turbo Commander for its aircraft pool operations, it would be better for the state to terminate the current rental agreement and purchase a used 1974 Duke for use in conjunction with the Turbo Commander. If the division needs only one such aircraft--and there are indications that the division does not know the extent of its needs as discussed previously--it would be better for the state to terminate the current rental agreement for the Duke and use the Turbo Commander. Either decision should be based first upon a quantifiable analysis of what is needed and, second, a life cycle analysis of each alternative.

Queen Air

Periodically the engines on all aircraft must be inspected, rebuilt or replaced. Based on present use the Queen Air's engines will need to be replaced or rebuilt during the summer of 1977. When the division has used the remaining time on the Queen Air's engines it must decide whether to replace engines or replace the aircraft. The division estimates the work on the engines will cost about $35,000.

As previously mentioned the division's budget request for the 1977-79 biennium included a request to trade the Queen Air in on one of three

additional aircraft. The division's budget request stated that the Queen Air should be replaced because it was increasingly expensive to operate.

The Aeronautics Division has not compared the life cycle costs of replacing the Queen Air's engines with the costs of other alternatives. Consequently, the division is not in a position to make a sound decision as to what should be done--replace the engines, sell the aircraft or trade it in on a replacement aircraft.

We compared the life cycle costs of replacing the Queen Air's engines with two other possible alternatives--purchase comparable aircraft or lease comparable aircraft. Our comparison was based on an assumed aircraft use of 300 hours per year and a useful life of six years. The life cycle analysis and comparison of the alternatives on the preceding basis showed that it would cost about $248,000 over the period to replace the engines in the Queen Air, while another aircraft--a 1975 Beechcraft Baron B-55, a twin engine, five passenger aircraft which could replace the Queen Air--would cost about $270,000 for a 1975 model over the same period. The analysis also showed that the Beechcraft Baron aircraft or a Cessna 310 could be leased and operated over the period at a cost of about $250,000. In contrast to the foregoing, a 1975 Piper Seneca II aircraft (a twin engine, five passenger aircraft) could be purchased and operated for about $185,000 during the period.

The division's budget request for a light twin engine aircraft estimated the purchase price at $180,000. Both a 1975 Piper Seneca II and a 1975 Beechcraft Baron B-55 could be purchased for less. However, purchase price is not the only cost to be considered. The operating costs on the Baron B-55 are such that it would be more costly to buy and

operate than it would be to replace the engines on the Queen Air. Conversely, because the purchase and operating costs for a 1975 Piper Seneca II are relatively low, and operation of it would cost less than operating and maintaining the Baron B-55 or the Queen Air for six more years.

The four alternatives for which we compared costs are not the only ones available to the Aeronautics Division and we are not suggesting that the division exercise one of the alternatives we have evaluated. However, we are suggesting that the division compare the life cycle costs of viable alternatives before making its decision.

The rebuilding or replacement of aircraft engines is a predictable, recurring and relatively costly item of aircraft maintenance. The life of aircraft engines varies. Some of the state's other aircraft, the Cessna 180's and the A-36, may be due for engine overhauls during the coming biennium and the state will again be confronted with determining whether to rebuild or replace the engines or replace the aircraft. When making these determinations, the Aeronautics Division should prepare life cycle cost analyses similar to those discussed for the Queen Air.

CONCLUSION

The Aeronautics Division's purchases and lease of aircraft represent significant capital outlays which should be based upon sound analysis of the alternatives. All state agencies should prepare life cycle cost comparisons of alternatives when assessing the need to repair or replace major items of equipment.

In the past, other state agencies have requested funds for major equipment acquisition without comparing the costs of alternative methods. In 1974 (Special Report to the Legislative Audit Committee, December 27,

1974), we reported on the continued lease of farm equipment for the ranch at the state prison; in 1975 (Special Report to Representative Robert L. Marks, March 4, 1975), the Department of Institutions requested funds to build a new laundry center without comparing the costs of leasing; and in October 1975 (Montana Agricultural Experiment Station, Report on Examination of Financial Statements, October 31, 1975), we reported that the Agricultural Experiment Station had not compared costs for alternative procurement methods for farm equipment it was leasing.

State agencies should be required to compare the costs of alternative methods using life cycle cost analysis before requesting funds for equipment procurement. Such cost comparisons should be submitted to the Governor's Office of Budget and Program Planning and the Legislature for consideration in evaluating budget requests for the acquisition of major equipment items.

RECOMMENDATION

We recommend that:

1. *The Aeronautics Division prepare life cycle lease versus purchase cost comparisons for various aircraft it needs before purchasing or leasing additional aircraft.*
2. *The Governor's Office of Budget and Program Planning require all state agencies to submit life cycle analysis and comparisons of lease versus purchase to its office in support of all budget requests for major equipment items.*

AGENCY REPLIES

DCA
MONTANA DEPARTMENT OF COMMUNITY AFFAIRS
Capitol Station, Helena Montana 59601
Thomas L. Judge
Governor

RECEIVED
FEB 3 1977
MONTANA LEGISLATIVE AUDITOR

February 3, 1977

Morris L. Brusett
Legislative Auditor
State Capitol
Helena, Montana 59601

Dear Morris:

Enclosed please find the response to the audit report covering our Aeronautics Division. If you need any additional information do not hesitate to contact me.

Sincerely,

Tom

Martin T. Mangan
Deputy Director

/njk

Enclosures

Harold Fryslie Director 406/449-3494

MONTANA LEGISLATIVE AUDITOR

We recommend that:

1. The Departments of Highways, Fish and Game, Livestock, and Natural Resources and Conservation transfer their aircraft and full time pilots to the Aeronautics Division.
2. The Department of Community Affairs make formal arrangements with the Department of Highways and Department of Fish and Game to compensate them for the use by other agencies of the aircraft transferred to the division and to allow them use of the transferred aircraft at rates which exclude depreciation until such time as the market value of the aircraft have been amortized.
3. Aeronautics Division prepare rules and regulations for the use of state aircraft including provisions for special assignment of aircraft.
4. The Aeronautics Division request the Department of Administration to obtain competitively bid purchase orders for the state's aviation fuel.
5. The Aeronautics Division request that its revolving account budget for aircraft operations be increased to include the cost of operating all state aircraft.

RESPONSE

1. We agree with the recommendation. However, the recommendation should be expanded to include pilots as authorized by the Aeronautics Division, and aircraft support facilities such as hangars and equipment. ("Aircraft" includes airplanes and helicopters.)

2. We do not agree with the recommendation. The provisions of Senate Bill 508 could be accomplished if the Aeronautics Division were given general fund monies to purchase aircraft from other state departments.

3. We agree with the recommendation. The Aeronautics Division, after receiving information from other departments, will prepare rules and regulations for use of state aircraft.

4. We agree with the recommendation. The Aeronautics Division will requisition the Department of Administration to obtain competitively bid purchase orders for the state's aviation and jet fuel in Helena.

5. We agree with the recommendation. The Aeronautics Division will request that its revolving fund budget be increased to a level which will include costs to operate all state aircraft.

RECOMMENDATION - Page 51

We recommend that the Department of Administration collaborate with the Department of Highways and the division to formulate procedures for inclusion in the Montana Administrative Manual governing the comparison of state employee transportation by aircraft pool and automobile.

RESPONSE

We agree with the recommendation. The Aeronautics Division will collaborate with the Department of Administration and the Department of Highways to formulate these procedures.

RECOMMENDATION - Page 54

We recommend that the Aeronautics Division:

1. Establish formal, written, and attainable objectives for the Air Transportation Bureau.
2. Develop a plan to accomplish these goals.
3. Establish measurement criteria and periodically evaulate Air Transportation Bureau progress.

RESPONSE

1-3. We agree with the recommendations. The Aeronautics Division will establish objectives, develop a plan, and measurement criteria to evaluate the Air Transportation Bureau progress.

RECOMMENDATION - Page 61

We recommend that the Aeronautics Division defer the acquisition of additional state aircraft and the disposal of existing state aircraft until:

1. All existing aircraft are centralized in the aircraft pool as required by law.
2. The state's air transportation needs and existing aircraft resources have been evaluated.

RESPONSE

1&2. We do not agree with the recommendations. The centralization of existing aircraft will not satisfy the present needs of the Aeronautics Division for twin engine all weather aircraft.

RECOMMENDATION - Page 69

We recommend that:

1. The Aeronautics Division prepare life cycle lease versus purchase cost comparisons for various aircraft it needs before purchasing or leasing additional aircraft.

2. The Governor's Office of Budget and Program Planning require all state agencies to submit life cycle analysis and comparisons of lease versus purchase to its office in support of all budget requests for major equipment items.

RESPONSE

1. We agree with the recommendation. Any additional request for leased or purchased aircraft will be accompanied by a formal cost comparison. Aeronautics Division presently uses life cycle analysis on their aircraft.

2. We agree with the recommendation. We will cooperate with the Governor's Office of Budget and Program Planning request for comparisons of lease versus purchase comparisons for major equipment items.

STATE OF MONTANA

DEPARTMENT OF HIGHWAYS

February 3, 1977

10:HJA

Mr. Morris L. Brusett
Legislative Auditor
Room 135, State Capitol
Helena, Montana 59601

Re: Airplane Pool

MONTANA LEGISLATIVE

Dear Morris,

Until such time as the Department of Highways is informed as to the fiscal and operational plan for the proposed airplane pool, the Department cannot concur with your office's recommendations as it relates to the Department of Highways' Aero-Commander, which was acquired with Highway User money and, indirectly, Federal funds.

The operational and fiscal plan should consider the following items which are pertinent to the Department of Highways and also the State.

1. Diversion of Funds - to avoid a controversy and possible legal action on diversion, the Department of Highways should be reimbursed for the plane, hangar, camera, and all items transferred to another agency. The recommendation by your office does not adequately address the problem of reimbursement to the Department of Highways. If the Department of Highways is not paid in full at time of transfer, interest should accrue on the unpaid balance.

2. Increased cost to Department of Highways - if the costs of aerial photography work under the proposed plan increase for reasons other than inflation, the Department of Highways should be reimbursed by the Aeronautics Division for those increases. One example would reflect the additional costs which could be incurred should the use of the private sector for aerial photography become necessary. Another example would be the direct and indirect increased cost caused by the use of an inadequate State plane for aerial photography. Also, if Federal Aid is denied because of increased costs those amounts denied should be paid to the Department of Highways by the Aeronautics Division.

(continued on page 2)

3. Priority for Aerial Photography - if the operational plan includes the use of a State plane for aerial photography, top priority should be given to aerial photography, particularly if the plane is to be also used for passenger service.

4. Maintenance - the Department of Highways currently follows strict maintenance standards for the Aero-Commander. This program is followed not only to protect the lives of the persons using the aircraft but to protect the Department's substantial capital investment. Any reduction in maintenance standards for a complex ship such as the Aero-Commander is a matter to be taken seriously by the State employees using the ship.

5. Aerial Photography - there has been discussion of placing the camera in a single engine plane, or a small twin, both non-pressurized. This is highly undesirable.

In closing, I would recommend that an in-depth look at our current aerial photography operations be taken by any legislative committee assigned the task of assessing the merits of an airplane pool.

Very truly yours,

H. J. ANDERSON
Director of Highways

HJA/be

cc: Honorable Thomas L. Judge, Governor-State of Montana
Francis Bardanouve, Chairman-Appropriations Committee (House)
J.D. Lynch, Chairman-Appropriations Sub-committee (House)
Dave Manning, Chairman-Highways & Transportation Committee (Senate)
William Baeth, Chairman-Highways & Transportation Committee (House)

STATE OF MONTANA

DEPARTMENT OF

FISH AND GAME

Helena, Montana
February 3, 1977

Mr. Morris L. Brusett
Legislative Auditor
State Capitol
Helena, Montana

MONTANA LEGISLATIVE

Dear Mr. Brusett:

In reference to the audit report of the Aeronautics Division, I would like to express my appreciation for the opportunity provided to discuss the preliminary draft report with the auditing team and the resultant changes made in the final draft.

I also wish to thank you for the opportunity to provide written comments on the final draft and will address the recommendations in the order in which they appear. But first I would like to make a general statement.

We in the Fish and Game Department believe that we are currently making efficient, effective, and appropriate use of our aircraft. Our aircraft serve special purposes, and our pilots have special training and perform important non-flying duties within the department. We see no benefits to us of an aircraft pool. We think we have reason to believe that our costs will go up and our effectiveness will go down. The report contends that centralized aircraft services will result in efficiencies and better service, but we find no evidence (in the report, or elsewhere) to support this contention. Furthermore, we believe that the Aircraft Pool Law specifically exempts us because our federal matching monies would be put in jeopardy.

Now let me address the individual recommendations:

Recommendation No. 1

I find what appears to be a conflict between the body of the report and the final recommendation concerning the proposed transfer of the full-time Fish and Game pilots to the Aeronautics Division. On page 41 it is suggested that the chief pilot of the Department of Fish and Game would probably not be transferred to the Aeronautics Division because of his additional duties as a game warden. The final recommendation suggests this transfer.

I prefer to believe the statement on page 41 and while it does not specifically include both full-time, Helena based Fish and Game pilots,

I presume it was intended to as both men have game warden status and duties in the Department of Fish and Game. Training of law enforcement personnel represents a considerable investment by the department and efficient governmental operation demands that such training be utilized. These men also have a considerable investment in the Game Warden's Retirement system -- over 19 years in one instance. These credits cannot be transferred to the Public Employees Retirement System. The infliction of such trauma on long term state employees is totally unacceptable.

I remain unconvinced that transfer of control of aircraft purchased with Fish and Game license dollars could be accomplished without diversion of funds in violation of Federal and State laws and rules and regulations of the U. S. Fish and Wildlife Service. The suggested rules and regulations to be promulgated by the Aeronautics Division governing use and reimbursement arrangements for the Fish and Game aircraft would have to be submitted to the Department of Interior for approval prior to implementation.

Recommendation No. 2

This recommendation was addressed in the answer to No. 1.

Recommendation No. 3

It is presumed that this recommendation includes assignment of specially equipped aircraft and special purpose aircraft such as the Super-Cubs owned and operated by the Department of Fish and Game and based in the field. Instead of assigning these aircraft to the Aeronautics Division and they in turn assigning them back to the Department of Fish and Game thereby increasing the paper work and increasing the overhead costs, it would make much more sense to allow them to be operated as they are at present. The Aeronautics Division knows of their existence, their location and their capabilities, and if a request were received from another state agency it would be a relatively simple matter to arrange for the satisfaction of that request by a phone call to the Director. The various state agencies have cooperated extensively in fulfilling such requests in the past as recognized in the report and an additional administrative layer would be costly and serve no purpose.

Recommendation No. 4

Not applicable to Fish and Game.

Recommendation No. 5

I suggest that not only the Aeronautics Division revolving account budget be increased, but the operation budget for that division be increased to accomplish the additional administrative duties implementation of these recommendations would impose.

I further suggest the other four departments that operate aircraft increase their budgets for aircraft use. Surely a part of the administrative costs of operating the aircraft pool will be passed on to them in increased hourly costs of aircraft operation.

Sincerely,

Robert F. Wambach

Robert F. Wambach
State Fish and Game Director

RFW:ec

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

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NATURAL RESOURCES BUILDING
HELENA, MONTANA 59601

February 3, 1977

MONTANA LEGISLATIVE

Mr. Morris L. Brusett, Legislative Auditor
Office of Legislative Auditor
State Capitol
Helena, MT 59601

Dear Mr. Brusett:

The Department's response to the audit of the Aeronautics Division as requested in your letter of February 1, 1977 is as follows:

Recommendation #1: The Department agrees to the transfer of the Cessna 180 to the Aeronautics Division. The DeHavilland Beaver was acquired from the federal government under the Clark-McNary program and since its use is restricted to fire protection activities it should be returned to the federal government.

Regarding the transfer of our Chief Pilot, we feel that since he spends the majority of his time in an administrative capacity he should not be transferred to the pool. In this respect we plan to review his duties and responsibilities and reclassify this position to properly reflect these duties.

Recommendation #2: No comment.

Recommendation #3: This should be done as soon as possible.

Recommendation #4: Good idea if workable.

Recommendation #5: No comment.

The Department's basic concern is that the aircraft pool is structured so that it can respond to the needs of the Department. During the forest fire season it is extremely important that aircraft be available on short notice, and provision must be made to allow the Aeronautics Division and the

Department the flexibility to respond to these emergencies. Normal operations of the Department require that aircraft be stationed at Missoula and Kalispell during the summer season to fly fire patrol and other related activities. We believe that the Aeronautics Division must be funded to allow it flexibility to provide aircraft and pilots as needed, and that these services should not exceed the costs presently being incurred by the Department.

If you require further information feel free to contact me or personnel of the Department.

Sincerely,

John C. Orth

JOHN C. ORTH, DIRECTOR
DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION

RI/eb
cc: Dick Isaacs
Gary Moon

STATE OF MONTANA
DEPARTMENT OF LIVESTOCK
HELENA, MONTANA 59601
406 449-2043

THOMAS L. JUDGE Governor

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February 4, 1977

Mr. Morris L. Brusett
Legislative Auditor
Office of the Legislative Auditor
State Capitol Bldg.
Helena, MT 59601

MONTANA LEGISLATIVE

Dear Mr. Brusett:

This is the Department of Livestock's response to the recommendations made in your office's audit of the aeronautics division.

Recommendation 1. "The Department of Highways, Fish and Game, Livestock, and Natural Resources and Conservation transfer their aircraft and full time pilots to the Aeronautics Division."

We are opposed to this recommendation insofar as it applies to the Department of Livestock on grounds that delivery of predator control services by helicopter would become more costly and less efficient, without providing significant benefits to the state through pooling. We believe this is so for the following reasons:

1. The continual use we make of our helicopters and pilots. The figures listed in illustration 3.1 show that the Department of Livestock had more than twice as many hours of flying per helicopter than the Aeronautics Division or the Department of Fish and Game. Thus we would be needing helicopters on a special assignment basis, making them generally unavailable for other purposes.

2. The fact that our helicopters are modified and our pilots specially trained for aerial hunting purposes.

3. Our belief that we can operate our helicopter programs at a significantly lower cost than could the Division of Aeronautics. We see no evidence in this audit to indicate that the Aeronautics Division could supply us with aircraft at a cost as low as we now pay even on a special assignment basis.

4. Placement of our helicopters into the state pool creates another layer of red tape. Since our predator control program is funded from earmarked funds we would need to continue to monitor the program and provide directional control. Pooling would require similar action by the Aeronautics Division, which is now not necessary.

One of the clear advantages of pooling that other agencies would have access to our helicopters. We do not oppose the use of our machines for emergencies, or the rare occassions when they are not being used for predatory animal control. However these uses can be accomplished simply through a request direct to the Department of Livestock.

Another point to note for whatever it is worth. The pooling act (section 1-1101 et seq.) is drawn up in terms of the pooling of "airplanes" not "aircraft". Under standard dictionary, aviation, and legal usage a helicopter is not an airplane.

We have no comments on recommendations 2 through 5 except to support recommendation number 4.

Yours very truly,

LES GRAHAM, Administrator
Brands-Enforcement Division

LG/CB/so

STATE OF MONTANA
DEPARTMENT OF ADMINISTRATION
DIRECTOR'S OFFICE
MITCHELL BUILDING
HELENA, MONTANA 59601

THOMAS L. JUDGE Governor

February 3, 1977

Mr. Morris L. Brusett
Legislative Auditor
Office of the Legislative Auditor
State Capitol
Helena, Montana 59601

MONTANA LEGISLATIVE

Dear Mr. Brusett:

Re: Aeronautics Division Audit

Aviation Fuel

RECOMMENDATION

We recommend that:

(4) The Aeronautics Division request the Department of Administration to obtain competitively bid purchase orders for the state's aviation fuel.

We generally agree with this recommendation; however, it should at first be limited to the three to five largest airports in Montana. Experience may show that it is only feasible at Helena and Missoula.

Least Costly Mode of Transportation

RECOMMENDATION

We recommend that the Department of Administration collaborate with the Department of Highways and the division to furmulate procedures for inclusion in the Montana Administrative Manual governing the comparison of state employee transportation by aircraft pool and automobile.

We generally concur with the recommendation and will gladly cooperate with the named agencies and help them publish their operating guidelines in the Montana Administrative Manual. However, in calculating the savings, we believe the cost and time of ground transportation after the employee lands at an airport should be included.

Sincerely,

Jack C. Crosser

Jack C. Crosser, Director

STATE OF MONTANA

Office of the Governor

Budget and Program Planning

Thomas L. Judge
Governor

Michael G. Billings
Director

Capitol Building Helena, Montana 59601

February 3, 1977

Mr. Morris L. Brusett
Legislative Auditor
State Capitol Building
Helena, Montana 59601

MONTANA LEGISLATIVE

Dear Morris:

This letter is in response to a recommendation included on page 69 of your report on the audit of the Aeronautics Division. The recommendation is as follows:

2. *The Governor's Office of Budget and Program Planning should require all state agencies to submit life cycle analysis and comparisons of lease versus purchase to its office in support of all budget requests for major equipment.*

OBPP comments: The Office of Budget and Program Planning concurs with the apparent intent of the recommendation and will implement the necessary procedures to effect the recommendation as soon as possible.

Since no definition of major equipment is provided, it is assumed that the intent of the recommendation is for OBPP to define which equipment acquisitions should undergo the recommended analysis and comparisons.

Sincerely,

Mike Billings

Michael G. Billings
Director